MX-4 DV™
User Guide

FOCUS
e n h a n c e m e n t s

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CHAPTER 1

INTRODUCTION

Welcome to the MX-4 DV, and thank you for buying FOCUS Enhancements products.

This chapter contains:

- Brief descriptions of major MX-4 DV features
- Typical uses for the MX-4 DV
- How to contact FOCUS Enhancements
- An inventory of package contents
- Description of the contents of this User Guide

Please take a few moments to read the material so you can take full advantage of all MX-4 DV benefits.

MAJOR FEATURES

MX-4 DV contains features found on most video mixers. In addition, it contains the special features described in this section.

Superb Video Quality — To ensure the highest video quality, the MX-4 DV uses 10-bit (4:2:2) video technology for Y/C applications, and 8-bit 4:2:2 for composite applications.

Four Input Synchronized Switcher — MX-4 DV provides four input channels that mix analog sources. This makes MX-4 DV useful in live production settings where up to four cameras or other sources might be in use. MX-4 DV synchronizes the inputs, so picture disruptions do not occur when switching between sources.

Picture-in-Picture (PIPs) — PIP allows multiple pictures to share the screen in various configurations. For example, one source might take the entire background while another image appears inside a separate, smaller window, both sharing the screen at the same time. You can use up to 4 images in a PIP configuration.

Effects Generator — Use a variety of effects to enhance a source or transition between sources. Select from over 700 effects, including natural shapes (diamonds, three leaf clover, and so forth), fancy edges, and borders. You can also build your own custom menu for quick access to those effects you use most often. Take advantage of FOCUS Enhancements downloadable subscription site which provides additional new transitions and natural shapes to better serve your production needs.

Time Base Corrector (TBC) — MX-4 DV automatically corrects the output's time base. MX-4 DV stabilizes the output signal even when the input sources are not stable.
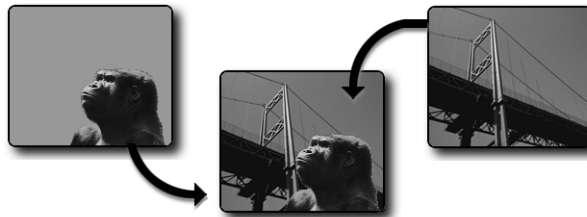
Chromakey — Keying replaces parts of one picture with another, based on their color. Here the solid background behind Kong is replaced by the picture of the bridge. The chromakey version shows Kong contemplating the bridge.

Frame Synchronizer and Digital Video Mixer — Mix any two input sources together using a variety of transitions — wipes, dissolves, flips, and so forth. With the frame synchronizer you can mix independent video signals.
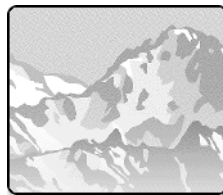
Compose — MX-4 DV provides a video painting system you can use to combine video stills, color shapes, and moving video on one screen. You can create a screen that contains a video still of a football coach (with a surrounding red border), combined with a moving video of the players in action on the field.

Audio Mixer — MX-4 DV provides sophisticated audio control. You can change the sound along with the video, or play a constant sound while the video plays. Audio can come from a video source or from external audio devices.

Connectivity — MX-4 DV provides multiple video/audio outputs, including one DV output, two Y/C Program outputs, two composite Program outputs, one composite Preview output, two sets of stereo audio outputs, and a Headphone output.

Joystick — The joystick gives you fine control over color adjustments and positioning of PIP (picture-in-picture), compose, and the chromakey cursor.

Color Correction — Apply true RGB color correction to any or all input sources. Color correction parameters can be set separately for each channel.

Input Effects — Apply special effects such as flips, mosaics, and others to the signals coming in from any input source. You now have the ability to adjust the brightness, contrast, color saturation and hue on your input sources and thumbnails.

Still Frame Jpeg Images — For the ultimate in creative expression, let the MX-4 DV allow you to trigger a stand-alone jpeg clips for background, input, or foreground use in your live video production programming. You can import and store up to 100 jpeg images (50 background and 50 foreground) using the Ethernet connection on the back of your unit.

Ethernet — You can network your MX-4 DV to a Mac or PC using an Ethernet (10Base-T) connector. You can import backgrounds, bugs and still frame jpegs to or from your unit.

Gradients — You can access eight gradients using the graphics menu.

COMMON USES FOR **MX-4 DV**

Multiple-Source Video Production — In a video production setup, you can connect one or more video sources (VCRs, camcorders, video disc players, cameras, title generators, computer graphics systems, and so forth) to MX-4 DV's four input channels. The Program output can then be sent to a VCR or directly to a monitor.

You can determine what is sent to the output. While the original inputs play, you can switch between any of MX-4 DV's channels. Use dissolves or other transitions to go from one channel to another. Add special effects to any channel, and use advanced features such as compose and chromakey to enhance the production.

Single-Source Use — MX-4 DV supports A/A roll, a method for creating interesting transitions with a single source. Its digital effects (such as picture freeze, posterization, and mosaic) give added life to productions. You can use MX-4 DV with a titler to mix and superimpose titles. Time base correction improves the picture (especially when making multiple-generation copies) by removing the jitter common to most VCRs.

Live Video — In live production setups, MX-4 DV processes events as they occur. Good coverage requires seeing the events from different vantage points—which means you need multiple input sources. MX-4 DV gives you the ability to connect up to four sources simultaneously. For example, at a sporting event, camera one might focus on the playing field, camera two on the team benches, camera three on the announcer, and camera four on the scoreboard. Using MX-4 DV you can easily switch between the sources whenever necessary.

> ℹ️ NOTE
>
> MX-4 DV is *not* an edit controller — that is, it does not control VCRs, camcorders, and similar devices. You can control the sources manually, or use external edit controllers such as those manufactured by FOCUS Enhancements.

MX-4 DV PACKAGE CONTENTS

The MX-4 DV package contains the items shown below. Check your package against the illustration.

MX-4 DV Unit
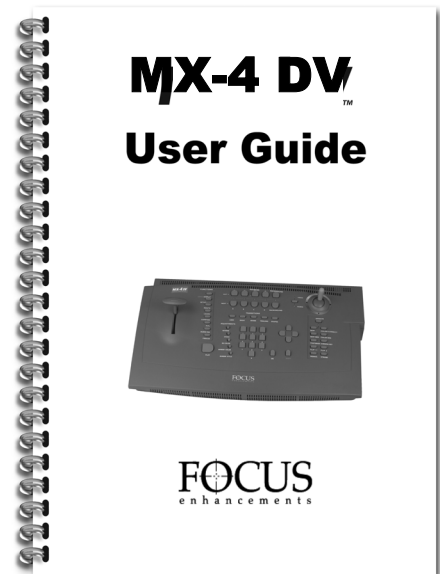
USER GUIDE
Product registration card and other information

POWER ADAPTER AND CORD

If your package doesn't contain all of the items shown here, contact the dealer where you purchased the MX-4 DV for the necessary replacements.

ABOUT THIS USER GUIDE

This User Guide contains the chapters, appendixes, and other sections shown in the following table.

Table 1: User Guide Contents

CHAPTER	DESCRIPTION
Chapter 1 **Introduction**	Basic overview of MX-4 DV features, description of package contents, description of manual.
Chapter 2 **Quick Start**	Brief steps to setting up MX-4 DV with your equipment. Provided for people quite familiar with connecting video equipment.
Chapter 3 **Installing** MX-4 DV	Instructions for setting up MX-4 DV to work with your video equipment.
Chapter 4 **Basic Operations**	Explains most common procedures and functions used with MX-4 DV.
Chapter 5 **Transitions**	Complete description of and instructions for using MX-4 DV transitions. Also see Appendix A, Transitions List.
Chapter 6 **Input Effects**	How to use various effects with video input material.
Chapter 7 **Functions**	Descriptions of and instructions for using MX-4 DV's built-in functions.
Chapter 8 **PIPs**	Instructions for using the picture-in-picture functions.
Chapter 9 **Compose**	How to create composed images consisting of rectangles, lines, still images, and/or moving images.
Chapter 10 **Chromakey**	Instructions for creating chromakey images where specific colors (such as a blue screen) can be keyed out and replaced with a video sequence or other image.
Chapter 11 **Learn Mode**	How to use MX-4 DV's Learn Mode for "recording" your mixing steps then playing them back.
Chapter 12 **Working with Audio**	How to use audio sources (tapes, CDs, and so forth) with MX-4 DV.
Chapter 13 **Advanced Operations**	Descriptions of operations used infrequently, but still of substantial use for mixing video programs.
Appendix A **Transitions List**	Complete list of transitions available with MX-4 DV, along with their assigned code numbers and descriptions.
Appendix B **Time Base Corrector**	Explains the time-base corrector feature built into MX-4 DV.
Appendix C **Video Quality**	Discusses issues concerning the level of quality in videos — that is, what to expect and what you can do to improve quality.

Table 1: User Guide Contents (continued)

CHAPTER	DESCRIPTION
Appendix D **Technical Specifications**	MX-4 DV product specifications.
Appendix E **Help for MXPro DV Users**	Summarizes operational differences between MX-4 DV and FOCUS Enhancements's Video Mixers.
Glossary	Definitions of terms frequently used in conjunction with MX-4 DV and video mixing procedures.
Index	Standard index to topics in this manual.

Conventions   The User Guide employs the conventions described in this section.

Tips, Notes, Cautions, and Warnings use the following formats.

TIP

A tip provides useful information for doing various tasks and procedures.

NOTE

Notes contain information to supplement the other information contained throughout the guide.

CAUTION

Cautions warn that if you continue with what you are doing there is a danger of losing information.

WARNING

Warnings mean stop what you are doing because there is danger of losing information and, possibly, damaging your equipment.

MX-4 DV Buttons   When referencing the various buttons (keys) and other controls on the MX-4 DV keyboard, they appear in uppercase, boldface characters. For example, the keyboard contains the **PLAY** button and **T-BAR**.

In some cases you use two buttons together to perform a function. This is normally done using the shift button in combination with some other button. A plus (+) symbol indicates this. For example, you might be asked to enter **SHIFT+PIPS** to start MultiPIP mode. This means press and hold down the **SHIFT** button, press the **PIPS** button, then release both.

SHIFT   +   PIPs

Sources, Channels,   The terms *Source*, *Channel*, and *Output* appear extensively throughout this guide. It's important to
and Outputs   understand the differences between them.

A **Source** is a physical device, such as a VCR, that provides a video and/or audio signal.

A **Channel** is an internal MX-4 DV video signal path. The video and/or audio signal originating from a source travels along one of the channels.

An **Output** displays or records a mixed signal (such as the video on one channel, a transition, and the video on another channel) on an output device. The output device might be a recording VCR or a live broadcast signal.

CHAPTER 2

QUICK START

This chapter contains brief instructions for setting up MX-4 DV with basic equipment. The instructions do not go into detail. If you feel comfortable connecting video and audio equipment, you can probably get started quickly using these instructions.

If you are upgrading from the Videonics MXPro DV, refer to Appendix APPENDIX E, *Help for MXPro DV Users*, for helpful information in setting up your MX-4 DV.

Skim the instructions in this chapter. If you have any questions about any of the steps, turn to Chapter 3, *Installing the MX-4 DV*, and follow the detailed instructions for setting up your equipment.

QUICK START STEPS

Setting Up
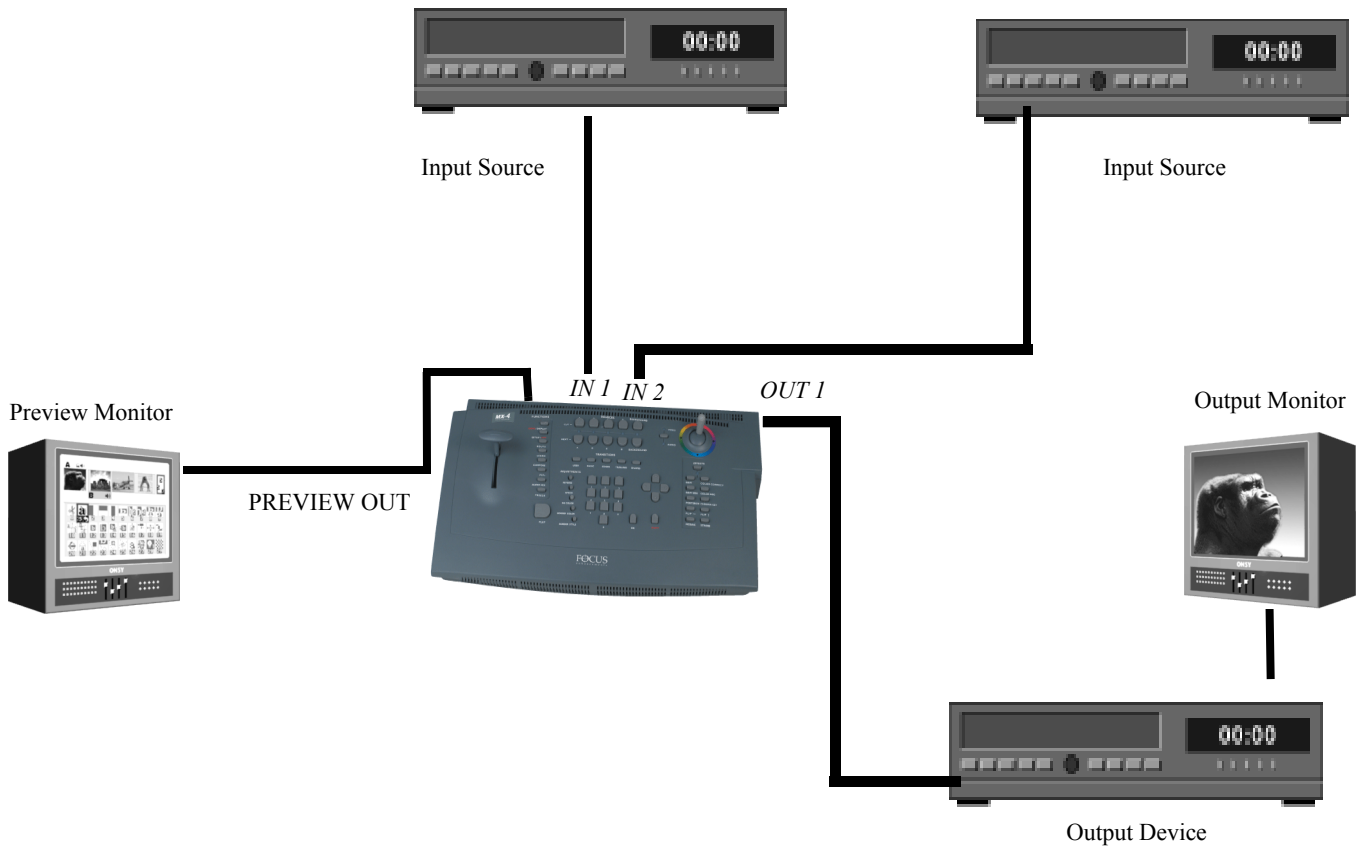
- **Connect a COMPOSITE-type monitor to MX-4 DV's PREVIEW OUT jack.**
- **Connect an Input Source (such as a VCR or camcorder) to the MX-4 DV's DV IN 1 jack.**
- **Connect a second Input Source to the MX-4 DV's Y/C IN 2 jack.**

  The MX-4 DV is set up, by default, to expect DV devices to be connected to the DV IN 1 and DV IN 2 input jacks, and S-Video (Y/C) devices to be connected to the IN 1 and IN 2 input jacks. If you connect a different assortment of input devices, you must tell the MX-4 DV this fact. Refer to "Route" beginning on page 73 after completing the following steps.

- **Connect an output device to the OUT jacks on the MX-4 DV rear panel. This is the device where you record the program.**

  Remember, a DV connector carries the audio signal as well as the video signal. It is, therefore, unnecessary to make separate connections for these signals when using a DV device as output.

- **Connect a television or monitor to the recording VCR according to their instructions. Having this monitor available lets you see exactly what is being recorded (or, output).**

  🛈 NOTE

  These instructions assume there is a two-monitor setup. If you are using only one monitor, connect it to PREVIEW OUT.

- **Connect the MX-4 DV power supply to the power supply jack on the rear panel.**

- **Connect the MX-4 DV's power cord to a suitable outlet.**

- **Turn on all devices (the MX-4 DV power switch is located on the right end of the unit) and let the tapes roll.**

For more detailed information about setting up your equipment, refer to Chapter 3, *Installing the MX-4 DV*.

The Preview Screen

NEXT Source

CURRENT Source

You should see a Preview screen similar to this on your Preview monitor.

Previews

Transitions Menu
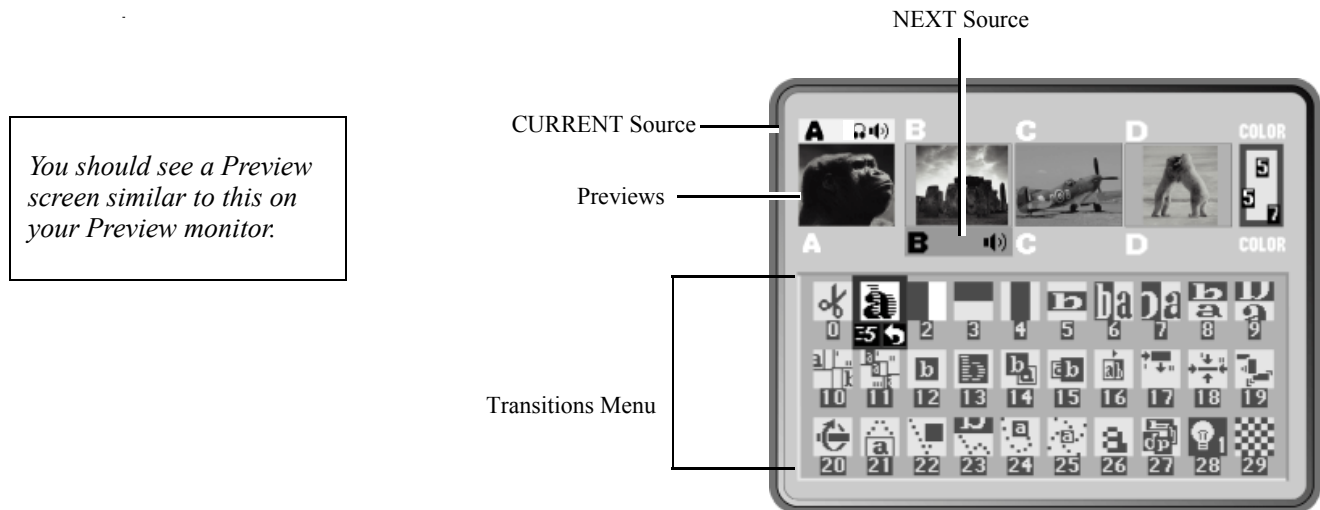
> **ⓘ** NOTE
>
> The MX-4 DV provides a small preview screen in the user interface with the sources you have attached. The images are scaled down in size, therefore, don't play as smoothly as they would in a single-source video monitor image. This does not affect the quality of the video going to the output — it is always highest quality. In addition you will be able to view beforehand your source images before running your transitions. Take advantage of the ability to adjust the Brightness, Color Saturation, Contrast and Hue while viewing it on your preview screens. Refer to the video adjustment menu section in Chapter 4 for these adjustments.

The PREVIEW screen contains the elements you need to run transitions:

CURRENT Source — The signal currently playing on your Output monitor. The MX-4 DV highlights the CURRENT source in yellow (just above the preview images).

NEXT Source — The signal that will play on the Output monitor after the transition runs. The MX-4 DV highlights the NEXT source in green.

Transitions Menu — Rows and columns of icons representing some of the transitions available. The MX-4 DV highlights the currently selected transition in blue. The icons also show the speed and direction for the selected transition.

Near the upper-right corner of the Preview screen is the color channel. The swatch uses numbers to indicate the current background color, border color, and border style.

For more detailed information about controlling the content of the Preview screen, see "Using the Preview Screen" beginning on page 35.

Using the Route The Route function ensures that the MX-4 DV understands where your input devices are connected
Function on the rear panel. If you connect Y/C devices to the IN1, IN2, IN3, and/or IN4 jacks, re-routing is
not necessary. Go on to the next section, "Running the Demo".

• After starting the MX-4 DV with all devices connected and turned on, press ROUTE to dis-
play the Route screen.
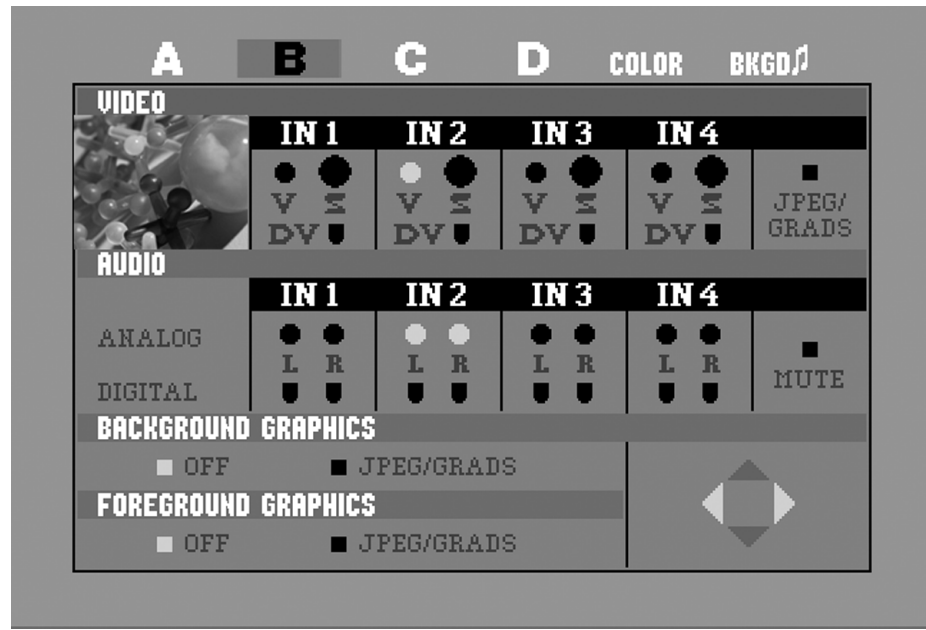
• Press the LEFT ARROW or the RIGHT ARROW to select the appropriate input S
(Y/C), V (Composite), or DV.

• To route other inputs to different channels, press NEXT/X, where X represents the chan-
nel to which you want to route. Then repeat the preceding step.

• Press ROUTE again to exit from the Route screen.

Running the Demo

The demo gives you a quick look at some of the MX-4 DV's important features and assortment of
transitions.

• Press the SHIFT+DEMO/DISPLAY buttons at the same time.

You should see the two sources alternating, with a variety of transition effects in between.

• Press any key to stop the demo at any time.

Cutting Between Sources

- **Press CUT/A.**
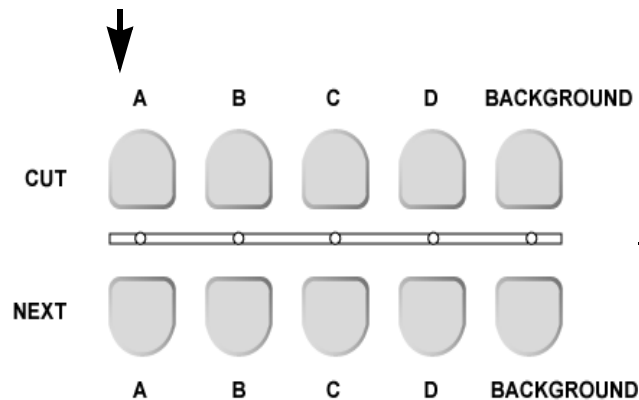
When you press a **CUT** button, the small light below the button glows steadily to indicate it is the CURRENT source.

When you press a **NEXT** button, the small light above the button blinks to indicate it is the NEXT source.

The light below the A button comes on and the Output monitor displays the signal from what-ever device is plugged into the inputs labeled IN 1. The yellow highlight above preview image A tells you it is the currently active input.

- **Press CUT/B.**

The light below the B button begins flashing (indicating B is both the CURRENT and NEXT source) and the Output monitor displays the signal from whatever device is plugged into the inputs labeled IN 2. The yellow highlight above preview image B tells you it is the currently active input.

- **If you have anything plugged into IN 3 or IN 4, press CUT/C and CUT/D, respectively, to display their signals.**

Borders and Solid Color Backgrounds
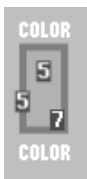
- **Press CUT/BACKGROUND.**

The MX-4 DV highlights the speaker, headphone, or color block above the channel indicator, but does not show the channel letter. The Output monitor shows a solid color screen.

- **To change the color, press BG COLOR.**

Each time you press the button the color changes in the background color sample and at the Output. Continue pressing the button until you see a color you like.

- **You can also define a border color and style to use at the edge of most transitions and PIPs. Press BORDER COLOR and the color around the background color sample shows you the new choice. Press BORDER STYLE to select from different styles for the border.**

Setting up a Transition

To set up a transition you need to select the sources you want to use and the transition you want to use when switching between them. Here's how to transition from source A to source B using a hor-izontal wipe.

- **Press CUT/A to set A as the CURRENT source. The MX-4 DV shows a steadily glowing light below the CUT button you press.**

- **Press NEXT/B to set B as the NEXT source (the one you want to see after the transition finishes running). The LED light above the button you press flashes to indicate it is the NEXT source.**

- **Use the ARROW keys to highlight the Wipe transition in the Transitions Menu, as shown in the following example.**

Use **LEFT** and **RIGHT ARROWS** to move the selection horizontally. Use **UP** and **DOWN ARROWS** to move the selection vertically: or, press **2** then **OK** to select the transition by number.
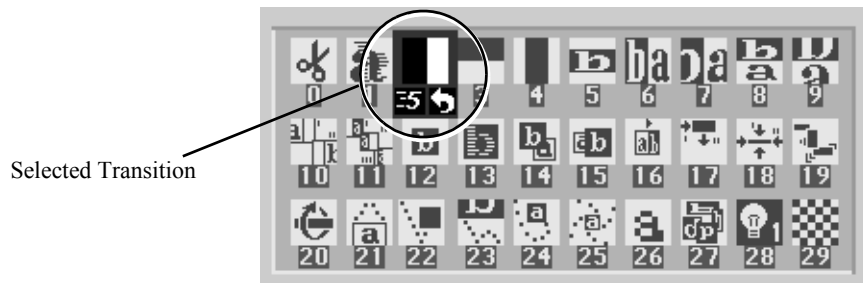
Selected Transition

The MX-4 DV transitions between the two sources using the horizontal wipe transition with the Output screen showing the results.

Running Transitions

You can run transitions automatically or manually.

Automatic Transitions
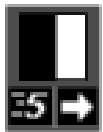
- **Press PLAY. The MX-4 DV runs the transition at a pre-determined speed**.

  The MX-4 DV transitions between the two sources using the horizontal wipe transition with the Output screen showing the results.

PLAY

At the end of the wipe, B is on the OUTPUT monitor — it has become the CURRENT source. The yellow highlight above the preview images has changed to reflect that. Furthermore, A is now the NEXT source and the green highlight has been changed to A.

Speed

- **To wipe back and forth between sources A and B, press PLAY repeatedly.**
- **To change the speed at which a transition runs, press the SPEED button. The Speed indicator under the transition icon changes.**
- **Press the button again until the desired speed appears. 0 is the slowest speed, 9 is the fastest.**
- **Try this with various speeds: Change the speed and press PLAY.**

Manual Transitions

Use the **TAKE BAR** to run transitions and control their speed and direction.

- **Set up the transition as you would normally. However, instead of pressing PLAY, simply move the T-BAR.**

  The transition begins running as soon as you move the **T-BAR**. You can even move back and forth by moving the **T-BAR** in different directions. Give it a try!

Using CUT Transitions

Most video productions use simple cuts a majority of the time. To cut between any two sources (for example, you could cut from A to C to BACKGROUND to D), use the **CUT** buttons.

There's a quick way to cut back and forth between two sources using just the **PLAY** button, instead of having to alternate between two **CUT** buttons:

- **Press 0 and then OK to select transition 0, a simple cut.**
- **Press PLAY again and again.**
- **A solid color screen can be used as if it were a separate source. Press the NEXT/BACKGROUND button and run any transition, or press CUT/BACKGROUND.**

Choosing Transitions

The Preview screen contains the Transitions Menu. This menu contains icons and other information for all MX-4 DV transitions. A blue highlight indicates the transition selected for the next transition.

- **Select Transitions in the following ways:**

  ARROW **keys** – Simply use the arrow keys to highlight the desired transition.

  NUMBER **keys –** The MX-4 DV assigns a unique number to every transition. The number appears below the transition icon on the PREVIEW screen (in the following example, the checkerboard transition is number 29). You can use the number to select a transition. (When you select/highlight a transition in the menu, the MX-4 DV shows the transition's speed and direction. At this point, the transition number is no longer visible.)

Transition Number 29

- **Enter 106 using the number keys (press 1, then 0, then 6), then press** OK **to highlight the transition icon.**

  The MX-4 DV replaces the current Transitions Menu and shows the one that contains the transition you selected.

- Press PLAY.

Using Transition Categories

The MX-4 DV categorizes transitions into five major groups — **User, Basic, Edges**, **Shapes**, and **Misc.** You can access any category at any time by pressing one of the Transition Category buttons.

USER　　　BASIC　　　EDGES　　　SHAPES　　　MISC.

When you press one of the buttons, the content of the Transitions Menu (see "The Preview Screen" on page 11) changes.

- **Press the** MISC. **button. The Transitions Menu display a completely different set of transition icons.**
- **Use the** ARROW **keys to highlight a transition you'd like to see run**.
- **Press** PLAY **or use the** T-BAR **to run the transition.**

The USER transition category is slightly different from the others. It originally contains a default set of transitions, each of which also exists in the other categories. You can "tailor" the content of the USER category to your specific needs and preferences. You'll learn more about this in later chapters.

Other Features

Refer to the rest of this User Guide to learn about the many additional MX-4 DV features, including:

- **Using the DEMO/DISPLAY button to change the content of the Preview screen.**
- Freeze the picture, and compress it.
- Separately control the sound.
- Apply input effects, such as mosaic, paint (posterization), negative, and more.
- Use chromakey to combine parts of one picture with parts of another.
- Compose your own pictures, made up of several stills, color rectangles, and a moving picture.
- Rearrange the inputs so A, B, C, and D, and their audio channels come from different rear panel jacks.
- Memorize a sequence of transitions and play them back.

INSTALLING THE MX-4 DV

This chapter explains how to install (or, set up) MX-4 DV to use with other equipment. Major topics include:

*   Understanding **Sources** and **Output**

*   Understanding **Preview** and **Program** monitors

*   Understanding the MX-4 DV connectors

*   Identifying **Cables** and **Adapters** you might need

*   Installation examples

*   Installing a **Microphone**

If you have experience with the Videonics MXPro DV, refer to APPENDIX E, *Help for MXPro DV Users*, for information that will be helpful setting up your equipment.

SOURCES AND OUTPUT

Source and *Output* refer to the way you use devices with MX-4 DV.
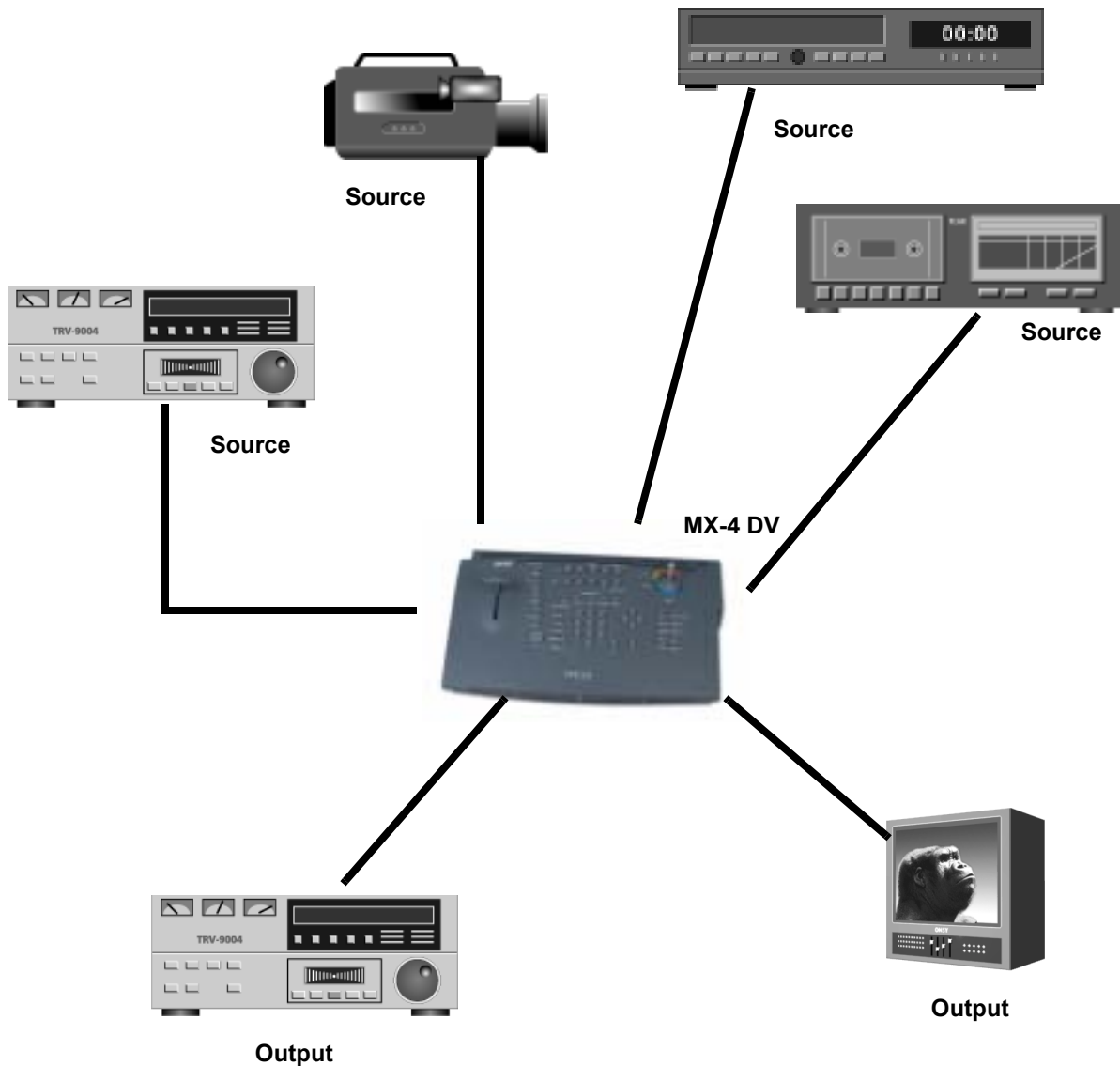
Source — A source is an input device. Each source provides a video signal, audio signal, or both. You use the MX-4 DV to combine and (optionally) animate these signals.

Output — An output is a device on which you record and/or broadcast a signal. The signal might contain video, audio, or both. This signal is often a mix of signals coming into MX-4 DV from one or more sources. The output device might be a VCR with an optional monitor attached, or it might be a live broadcast.

PREVIEW AND PROGRAM MONITORS

The MX-4 DV designates monitors as either *Preview* or *Program* to indicate how a particular monitor may be used. This manual uses the following picture to distinguish between the two monitors.

Preview Monitor

Program Monitor

Preview Monitor

The Preview monitor is your "working" monitor. Most of the time it contains controls for managing Source and Output devices. For example, it shows miniature versions of images coming from the attached VCRs and camcorders. The Preview monitor also shows a menu of transitions and other effects from which you can choose. Refer to "Using the Preview Screen" beginning on page 35.

> ⚠ **CAUTION** ──────────────────────────────
>
> **The preview monitor must be a Composite device. Do not attempt to connect any other type of monitor to the PREVIEW OUT jack on the MX-4 DV rear panel.**

Program Monitor

The Program monitor shows the production exactly as recorded on the output device or displayed in a live video environment. The Program monitor shows the program complete with transitions and other effects. You normally connect the Program monitor to the output device. The Program monitor can be either a Composite, or Y/C device.

Number of Monitors

You can operate the MX-4 DV with only one monitor connected to the Preview out. However, to greatly simplify your work you should have at least two monitors — one Preview and one Program. Instructions in this manual assume you have separate Preview and Program monitors.

UNDERSTANDING MX-4 DV CONNECTORS

To properly setup the MX-4 DV, you need to know how and where to connect external compo-
nents – such as VCRs, camcorders, and so forth. Use cables to connect video devices to the MX-4
DV's rear panel. Refer to "Cables and Adapters" on page 22.

Remove the MX-4 DV from its package and set it so you can see the rear panel. Refer to the panel
and the illustration on the next page while reading this section.

The MX-4 DV rear panel has numerous connectors and they vary by type. You can connect input
sources in any combination – up to a maximum of twelve – but you can use a maximum of four
devices at any given time. You can process just the video signal from a device, just the audio sig-
nal, or both.

You can connect four separate output devices to the MX-4 DV. You might, for example, direct one
output to a recording device and another to a live broadcast.

Note the labels associated with each connector on the MX-4 DV rear panel.

POWER — An electrical power connector. Use the power cord and adapter in the MX-4 DV
package to connect the unit to an electrical outlet.

Y/C IN— Connect Y/C sources to these connectors.

RCA IN — Connect composite sources to these connectors.

DV IN — Connect Digital Video sources to these connectors. Both the audio and video signal
is sent through these connections.

AUDIO IN — Connect audio devices to these connectors. Each set of connectors has L (Left)
and R (Right) jacks for stereo input. Refer to "Audio Connectors" on page 23.

HB IN — Connect a composite source such as a camera to lock on to and synchronize the
MX-4 DV with it.

GPI CONTROL — Connect a General Purpose Interface (GPI) device to this jack to control
the MX-4 DV from an external device or remote location. Refer to "Using a GPI Device"
beginning on page 120.

There are a total of eleven output connectors — one Preview, two composite, two S-Video, four
audio, and a Headphone jack.

PREVIEW OUT — Connect a composite video monitor to this jack. You cannot use an Y/C
monitor as Preview. This monitor serves as your visual "interface" with the MX-4 DV. It's
where you do most of your work.

DV OUT — Connect a Digital Video output device. You record productions on this device,
use it to display a live broadcast signal or both. Both the audio and video signal are sent
through this connector.

Y/C OUT— Connect an Y/C output device. You record productions on this device, use it to
display a live broadcast signal, or both.

RCA OUT — Connect a composite output device. Same as above, but use this connector if
your output device is composite format.

AUDIO OUT — Connect a suitable audio cable or cables from these jacks to the audio inputs
on your output device. Refer to Chapter 12, *Working with Audio*, for a discussion of the dual
audio output features.

HEADPHONES — Refer to "Using Headphones" on page 25.

MX-4 DV REAR PANEL

Please take a few moments to familiarize yourself with the connections on the MX-4 DV Rear Panel before you begin setting up your equipment.

Rear Panel Diagram
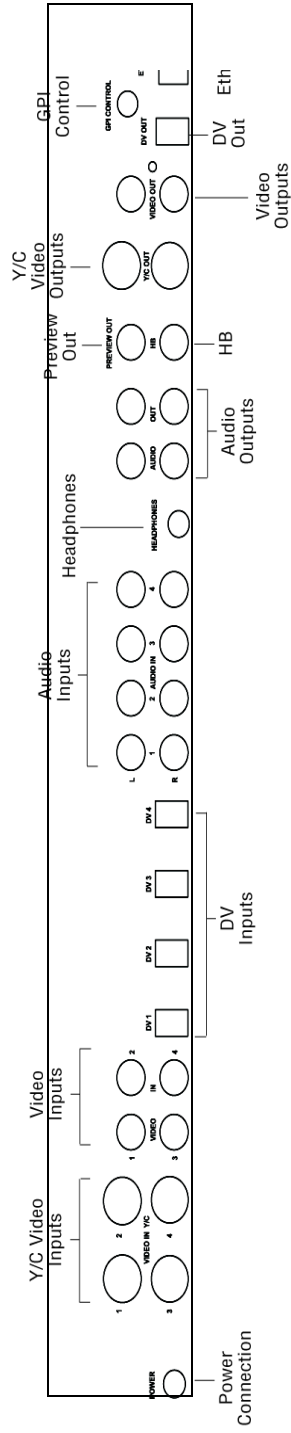
Power Connector

The MX-4 DV package contains the required transformer and power cord for the unit.

Male Socket ——— ——— Female Plug

Power
Adapter
Plug

Male
Plug

Transformer   Power Cord
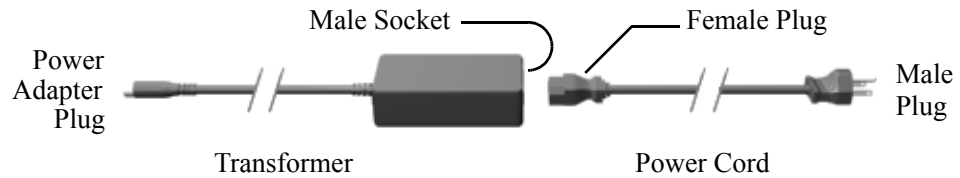
⛔ WARNING ——————————————————————————

USE ONLY THE POWER CORD AND TRANSFORMER PROVIDED IN THE PACKAGE. DO NOT USE THIS POWER CORD AND TRANSFORMER WITH ANY OTHER EQUIPMENT. FAILURE TO OBSERVE THESE CONDITIONS CAN DAMAGE YOUR EQUIPMENT AND VOID YOUR WARRANTY.

To connect the power cord and transformer:

1 Connect the female plug on the power cord into the male socket on the transformer.

2 Connect the male plug on the power cord to a suitable power outlet.

3 Connect the power adapter plug on the transformer cord into the power connector on the MX-4 DV rear panel.

4 Turn the MX-4 DV power switch (located on the right side of the unit) to the ON position.

CABLES AND ADAPTERS

To connect video devices to the MX-4 DV you need specific types of cables. You might also need one or more adapters, depending on your equipment.

Look closely at the jacks on the MX-4 DV rear panel and note that they accept RCA Composite, S-Video (Y/C), or Digital Video (DV)cables.

RCA
Composite

S-Video
(Y/C)

Digital Video
Connector
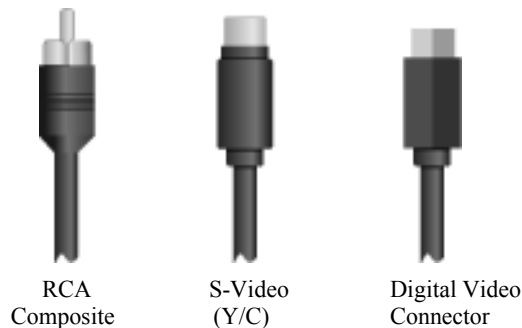
Before connecting any device to the MX-4 DV, make sure the cable you are using has the right type of fitting for the jack you intend to use.

⚠ CAUTION ————————————————————————————

When making connections, always connect the OUT from one device to the IN on the other device. NEVER connect OUT to OUT or IN to IN
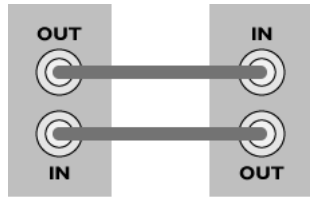
GOOD!
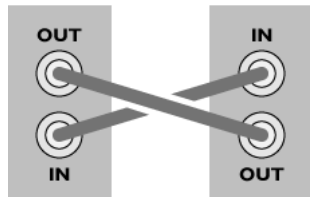
BAD!

Microphones

You can connect a microphone to any MX-4 DV input jack, but you may need a special adapter to make the connection. The type of adapter needed varies depending on the type of microphone you want to use. If you do not have the adapter you need, take your microphone to a local electronics supply store to make sure you select the correct adapter.

Audio Connectors   To connect a stereophonic audio device to the MX-4 DV, you need two separate audio cables — one for the left channel and one for the right.

To connect a monaural audio device you need a Y-adapter cable (like the one shown at the left). Connect the single end of the adapter to the line input or output on the device. Connect the two remaining ends to the left and right channel inputs or outputs on the MX-4 DV rear panel.

The Y-adapter cable does not provide stereophonic audio. It simply directs the mono signal to or from both MX-4 DV channels.

You can also connect a mono audio device, then connect the other end to either the left or right connector on any MX-4 DV audio input. Once connected, use the MX-4 DV ROUTE function to specify which connector (left or right you used. Refer to "Route" beginning on page 73.

INSTALLATION EXAMPLES

This section shows examples of two common MX-4 DV configurations, but does not describe every possibility. Before proceeding, study the following diagram (MX-4 DV Installation Concept) that shows overall configuration concepts.

MX-4 DV Installation Concept

> *This diagram illustrates the overall concept for installing equipment with MX-4 DV. Please study it before you begin installing your own equipment.*
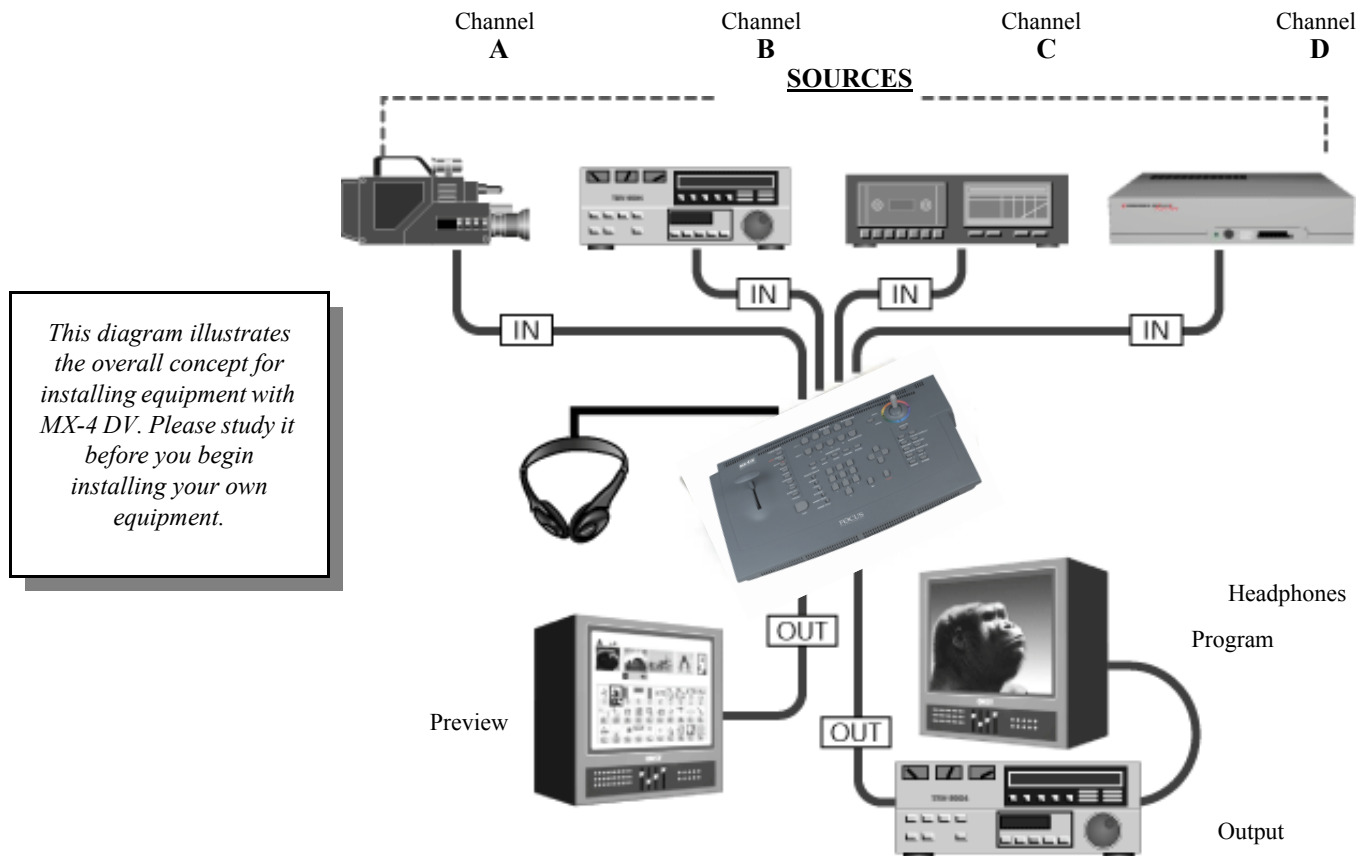
You can have up to four separate audio/video input sources active at any given time. The MX-4 DV designates them as sources A, B, C, and D. You can use any mix of devices as necessary to complete your work so long as they are valid MX-4 DV devices. For example, you can use VCRs, VTR's, camcorders, laserdisc players, satellite tuners, broadcast tuners/receivers, character generators (CG's), video-equipped computers, and audio devices (such as a CD player or tape deck).

The MX-4 DV sends the output signal to a recording device (such as a VCR) and/or a Program monitor.

Use a second monitor, Preview, to display preview images of all input sources. The Preview monitor also displays the on-screen controls you use to operate MX-4 DV. The Preview monitor is required for operation.

Correlating Input Sources to MX-4 DV Jacks

IMPORTANT INFORMATION

As stated above, the MX-4 DV designates your input sources as A, B, C, and D. However, if you examine the jacks on the MX-4 DV rear panel, you'll see they are labeled 1, 2, 3, and 4. Initially, there is a direct correlation between the letter and the number designations: jack 1 corresponds to source A, jack 2 corresponds to source B, jack 3 corresponds to source C, and jack 4 to source D. You can re-route inputs to other channels. For more information, refer to "Route" beginning on page 73.

Using Headphones

To use headphones, connect them to the Headphone jack, which is located on the middle of the unit. The jack accepts standard stereo headphones with a miniature plug. If your headphones have a large plug, you need an adapter to switch it to a miniature plug.

VCR Selector Switches

Many VCRs have an input selector switch that routes between Line (or AUX, EXT, A/V, or S) and Tuner. Here are some examples.
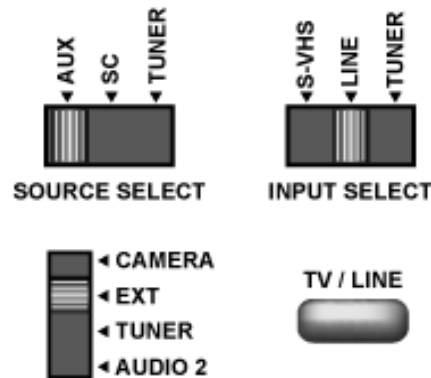
> *If a device has a switch similar to one of these, set the switch to the **LINE** position.*

Some VCRs have more than one VIDEO IN jack (for example, one might be Composite and the other Y/C). Set the switch to match the jack you are using as the connector to the MX-4 DV.

General Notes

When connecting video and audio outputs from source devices, most of the time you'll probably connect to corresponding jacks on the MX-4 DV rear panel. For example, if you connect the video to the VIDEO IN jack labeled "1," you'll most likely connect the audio to the AUDIO IN jack also labeled "1." However, this is not a requirement. You might use non-corresponding jacks — for example, you might connect the video from one source to VIDEO IN 1 but connect the audio from the same source to AUDIO IN 2 if you want to control the audio and video separately.

Remember, DV devices carry the audio and video signal (as well as a machine control signal) on the same connection.

Post Production Configuration

This configuration is useful in a **Post-Production** environment—where you mix two or more programs together.

This installation example below shows the use of DV equipment in combination with analog equipment.

1 Connect the VIDEO OUT from a DV VTR 1 to DV IN 1 on the MX-4 DV rear panel. Connect the AUDIO OUTs from a DV VTR 1 to AUDIO IN 1 on the MX-4 DV rear panel.

2 Connect the VIDEO OUT from a DV VTR 2 to DV IN 2 on the MX-4 DV rear panel. Connect the AUDIO OUTs from a DV VTR 2 to AUDIO IN 2 on the MX-4 DV rear panel.

3 **OPTIONAL** – Connect an audio source (CD player, tape deck, or microphone) to AUDIO IN 4 on the MX-4 DV rear panel.

4 Connect a Composite-type monitor to the PREVIEW OUT jack on the rear panel.

5 **OPTIONAL** - Connect a Character Generator (CG) to the OUT Y/C jack on the rear panel.

With this configuration you can superimpose titles from the CG atop the output signal.

6 Connect a recording VTR to the OUT Y/C jack on the rear panel.

If you are using the optional Character Generator (described above), connect the output from the CG to the VTR input.

7 Connect an Output Monitor to the recording VTR so you can see the signal being recorded.

8 Connect the power cord and transformer to the MX-4 DV rear panel. Refer to "Power Connector" on page 22 for instructions.

Use the Route function ("Route" beginning on page 73) to make sure your devices are directed to the correct MX-4 DV channels.

POST PRODUCTION CONFIGURATION
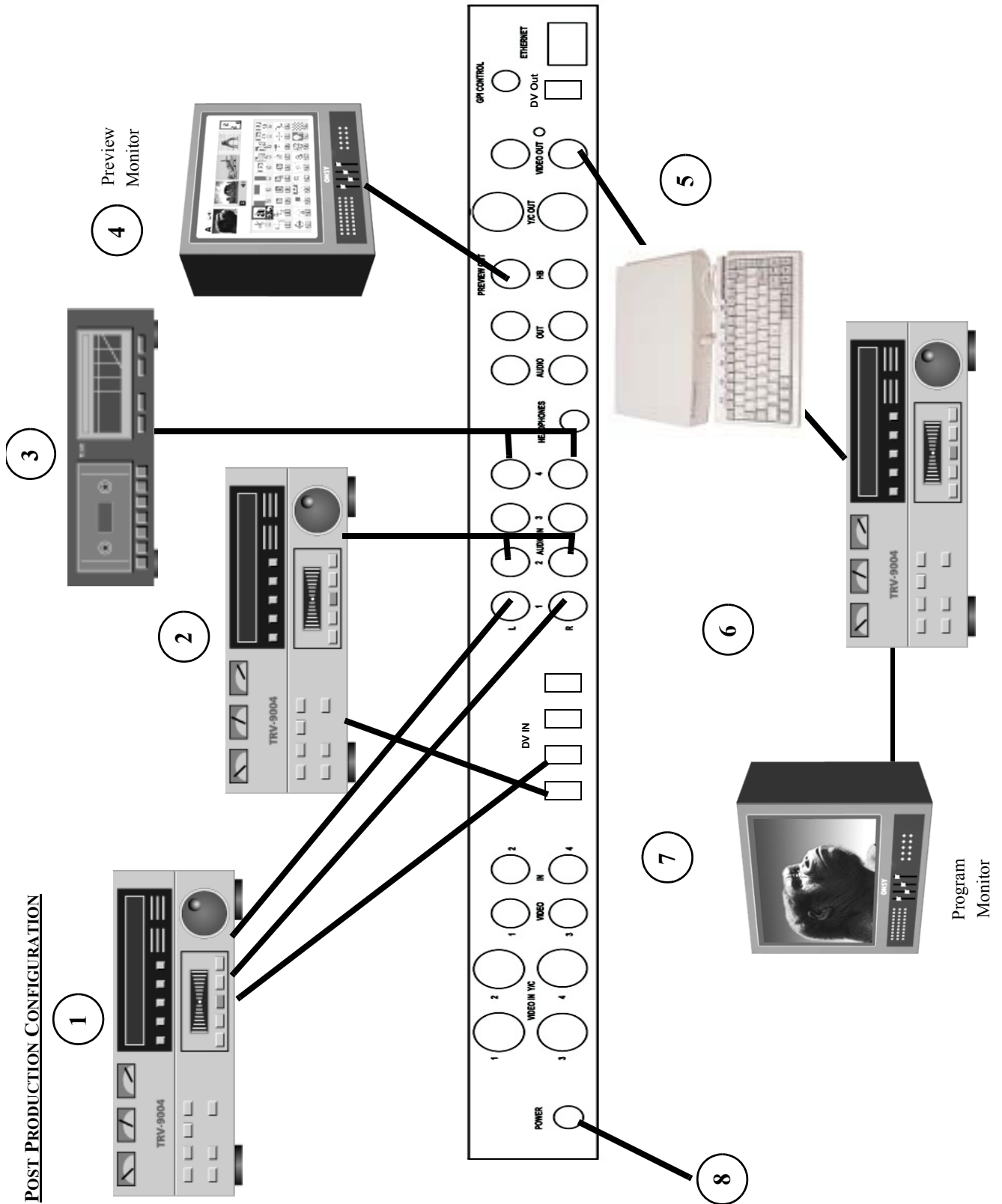
Live Broadcast Configuration

This configuration is useful in a **Live Broadcast** environment.

1 Connect the VIDEO OUT from Camera 1 to VIDEO IN 1 (Y/C) on the MX-4 DV rear panel. Connect the AUDIO OUTs from Camera 1 to AUDIO IN 1 on the rear panel.

2 Connect the VIDEO OUT from Camera 2 to VIDEO IN 2 on the MX-4 DV rear panel. Connect the AUDIO OUTs from Camera 2 to AUDIO IN 2 on the rear panel.

3 **OPTIONAL** – Connect an audio source (CD player, tape deck, or microphone) to AUDIO IN 4 on the MX-4 DV rear panel.

4 Connect a Composite MV-4 -type monitor to the PREVIEW OUT jack on the rear panel.

5 **OPTIONAL** – Connect a GPI trigger device to the GPI CONTROL on the MX-4 DV rear panel.

6 **OPTIONAL** – Connect a character generator (CG) to the OUT Y/C jack on the rear panel.

With this configuration you can superimpose titles from the CG atop the output signal.

7 Connect a recording VTR to the OUT Y/C jack on the rear panel.

If you are using the optional Character Generator (described above), connect the output from the CG to the VTR input.

8 Connect the Output Monitor to the recording VTR so you can see the signal being recorded.

9 Connect the Power Cord and Transformer to the MX-4 DV rear panel. Refer to "Power Connector" on page 22 for instructions.

Use the Route function (refer to page 73) to make sure your devices are directed to the correct MX-4 DV channels.

LIVE BROADCAST CONFIGURATION
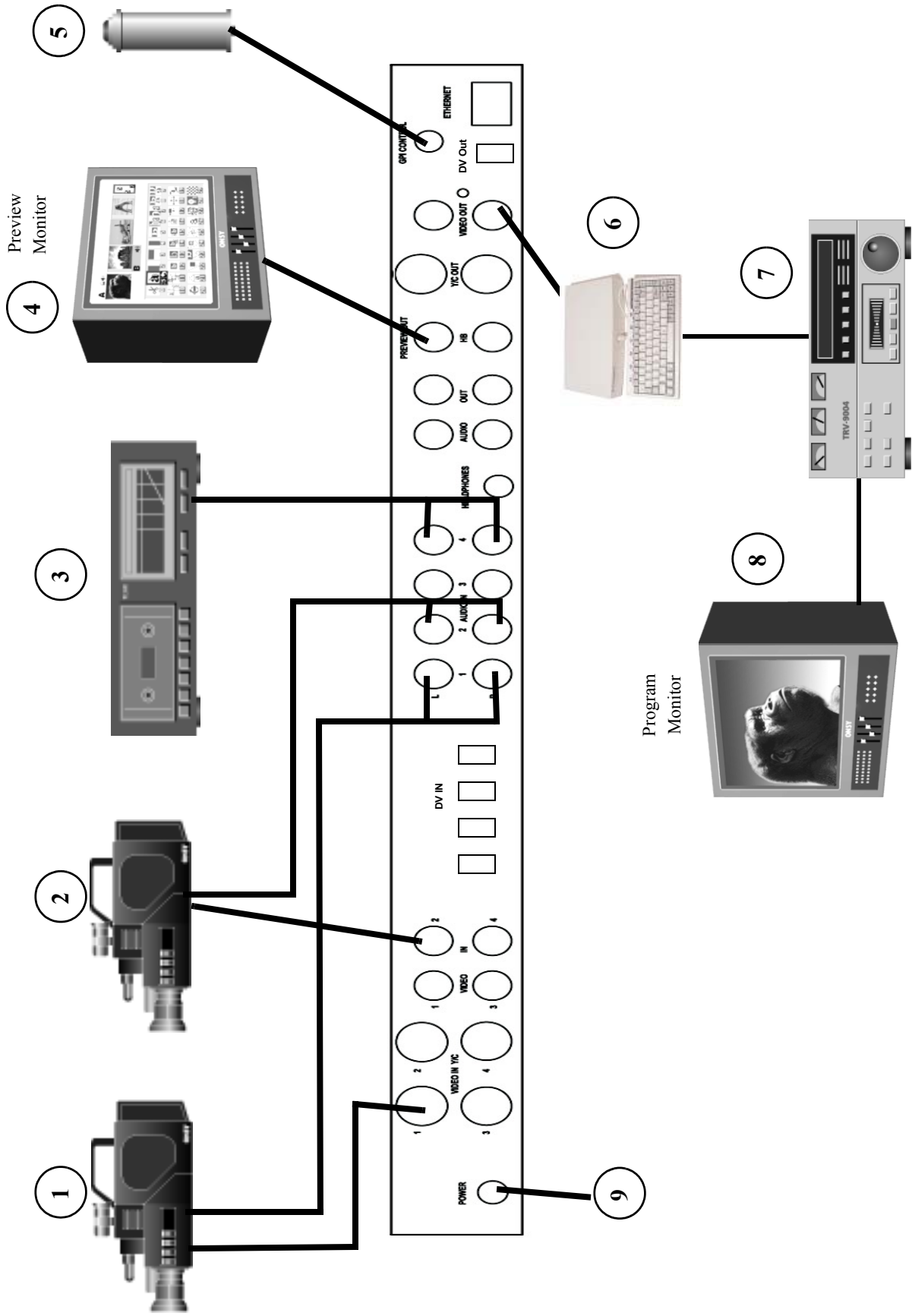
Using a Microphone with MX-4 DV

> *This section explains how to connect a microphone to MX-4 DV. You'll need the equipment listed below…*

- Professional quality microphone
- Microphone cable (male-XLR to female-XLR connectors)
- An audio direct box (which you can purchase from any professional audio equipment dealer)
- A 1/4 inch (phone jack) to RCA cable
- A female RCA to dual-male RCA "Y" Adapter

To connect a microphone:

1 Using the microphone cable, connect it to the XLR (balanced) input on the Direct Box.

2 Plug the 1/4-inch-to-RCA cable into the 1/4-inch (unbalanced) output on the Direct Box.

3 Attach the RCA "Y" adapter to the 1/4-inch-to-RCA cable.

4 Plug the two male ends of the RCA "Y" Adapter into the R and L audio inputs on the MX-4 DV rear panel. You can plug the microphone into any audio input and route it like any other source.

BASIC OPERATIONS

This chapter describes several basic MX-4 DV operations, including:

- Starting and stopping the MX-4 DV
- Using the MX-4 DV keyboard
- Using the Preview screen
- Using CURRENT and NEXT sources
- Selecting Sources
- Using the VIDEO/AUDIO selector
- Cutting Between Sources
- Working with Color
- Using Backgrounds
- Using Borders

Starting and Stopping the MX-4 DV

Press the Power switch to start or stop the MX-4 DV. The switch, located on the right-end of the unit, is a rocker-type switch.

Understanding the Keyboard

Use the MX-4 DV keyboard to control how the unit operates.

This section briefly describes the button groups and, in some cases, individual buttons and controls. Additional information appears throughout this User Guide. Some of the following descriptions provide a reference to the page where you can find details. Refer to the illustration on the next page while reading this material.

1   **T-Bar (or, Take Bar)** — Use to manually control the way transitions run, tile size in PIP mode, and audio levels in the Audio Mixer. Refer to Chapter 5, *Transitions*, Chapter 8, *PIPs*, and Chapter 12, *Working with Audio*, respectively. The **T-BAR** also controls the video adjustment sliders.

2   **Function Buttons** — Provide immediate access to built-in functions, including **DISPLAY**, **SETUP**, **FTP, ROUTE**, **LEARN**, **COMPOSE**, **PIPS**, **AUDIO MIX**, and **FREEZE**. You can also access the built-in demo using the **SHIFT+DEMO/DISPLAY** buttons. Refer to Chapter 7, *Functions*, for details.

3   **Source Selectors** — Use to select the CURRENT (**CUT**) and NEXT sources for a production. Normally, you select the CURRENT and NEXT sources, select a transition to use between the two, then run it. For example, you might select a camcorder as one input source (CURRENT) and a VCR as the other (NEXT). You then select a transition, such as a dissolve or wipe. When you reach the point in the CURRENT source where you want to change to the NEXT source, press **PLAY** or use the **T-BAR** to instruct the MX-4 DV to play the transition. The CURRENT source becomes the new NEXT source, and the old NEXT source becomes the new CURRENT source. (See "Using CURRENT and NEXT Sources" beginning on page 38.) Use the **COLOR** buttons to create solid colored backgrounds and other effects. (Refer to "Working with Colors" beginning on page 41.)

4   **Video/Audio Selector** — Determines whether VIDEO, AUDIO, or both VIDEO and AUDIO are affected when you run a transition. When set to **VIDEO**, the video changes but the audio does not. When set to **AUDIO**, the audio changes but the video does not. When set to both, the video and audio both change. Refer to "Using the Video/Audio Selector" on page 39.

5   **Joystick** — Provides an easy way to make fine adjustments to various components. For example, when using PIPs, the joystick positions the various picture elements on the screen. When using color correction, the joystick adjusts the color. The joystick has other uses you'll learn about in later chapters.

6   **Power Switch** — The Power switch is a rocker-type switch for turning the unit on and off.

7   **Transition Category Buttons** — Gives you immediate access to the five, major categories of transitions, including **USER**, **BASIC**, **EDGES**, **SHAPES**, and **MISC.** All MX-4 DV transitions fall into one of these categories. After pressing a button, you can search through the transitions in that category to find the one you want to use. Refer to "Transition Categories and Menus" beginning on page 50.

8   **Play Button** — Press to invoke the next command and complete a transition you have set up. In other words, set up your CURRENT and NEXT sources, select a transition, then press **PLAY** at the moment you want the MX-4 DV to perform the step.

MX-4 DV KEYBOARD
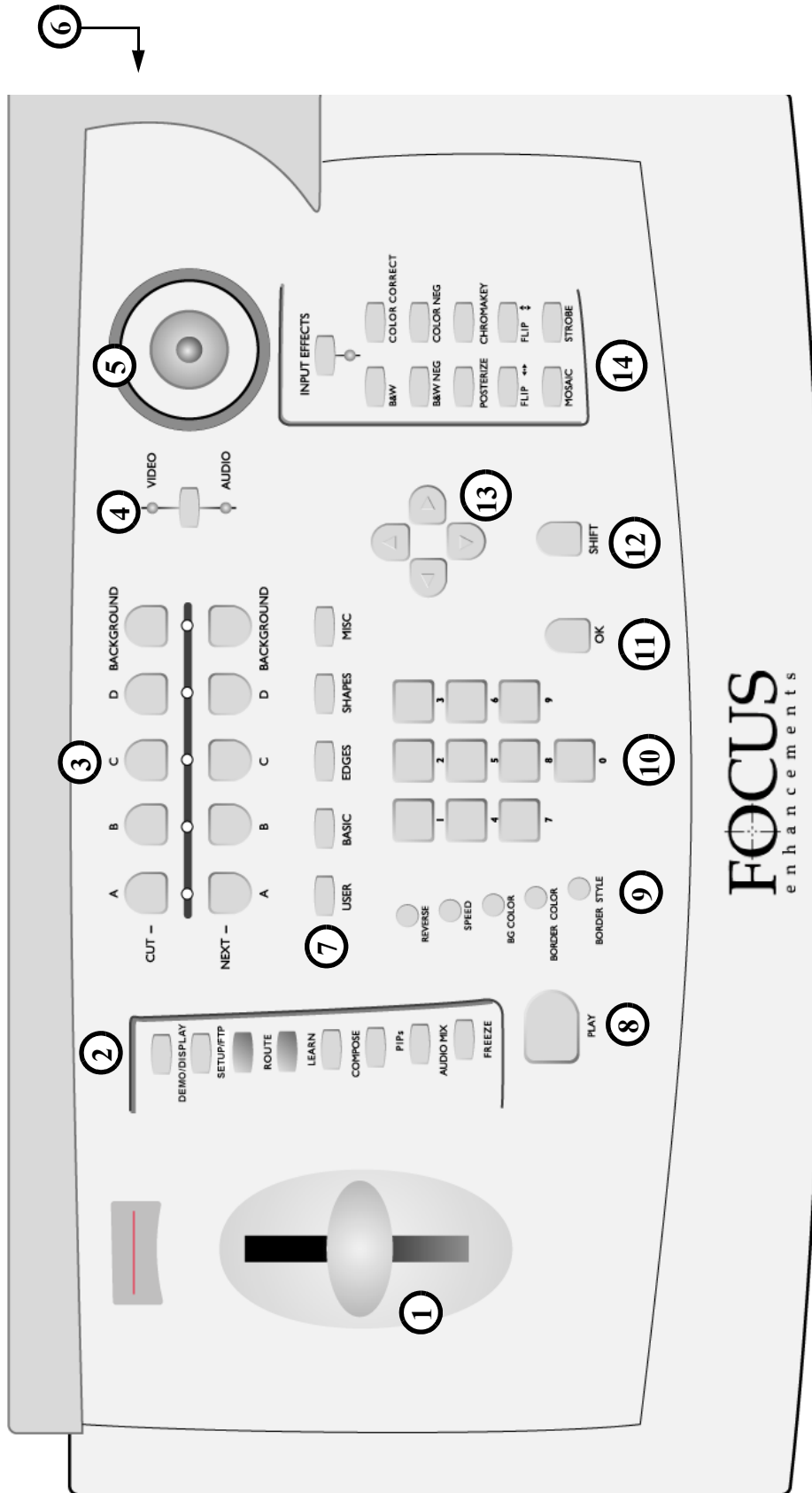
9   **Control Buttons** — Use these buttons to reverse transition direction, change transition speed, specify background and border colors, and set border styles.

10   **Numeric Keypad** — Use for various functions, such as entering the number of a transition you want to use, setting a precise speed for a transition, and so forth.

11   **OK Button** — Generally used to indicate to the MX-4 DV that you have completed some operation and want the unit to prepare for or perform it accordingly.

12   **SHIFT Button** — A modifier key that invokes special functions when used in conjunction with other keyboard keys.

13   **Arrow Keys** — Primarily used for selecting effects and functions. For example, use the arrow keys to highlight a transition you want to use in the Transitions menu.

14   **EFFECTS Buttons** — Provides access to effects you can apply to input sources. The light below the **EFFECTS** button glows when the MX-4 DV is in Input Effects mode. Refer to Chapter 6, *Input Effects*, for more information.

USING THE PREVIEW SCREEN

The Preview Screen is your control center for the MX-4 DV operations. This section describes individual items on the Preview screen. The Preview screen appears on the monitor attached to the MX-4 DV PREVIEW OUT jack.

PREVIEW MONITOR AND STANDARD PREVIEW SCREEN
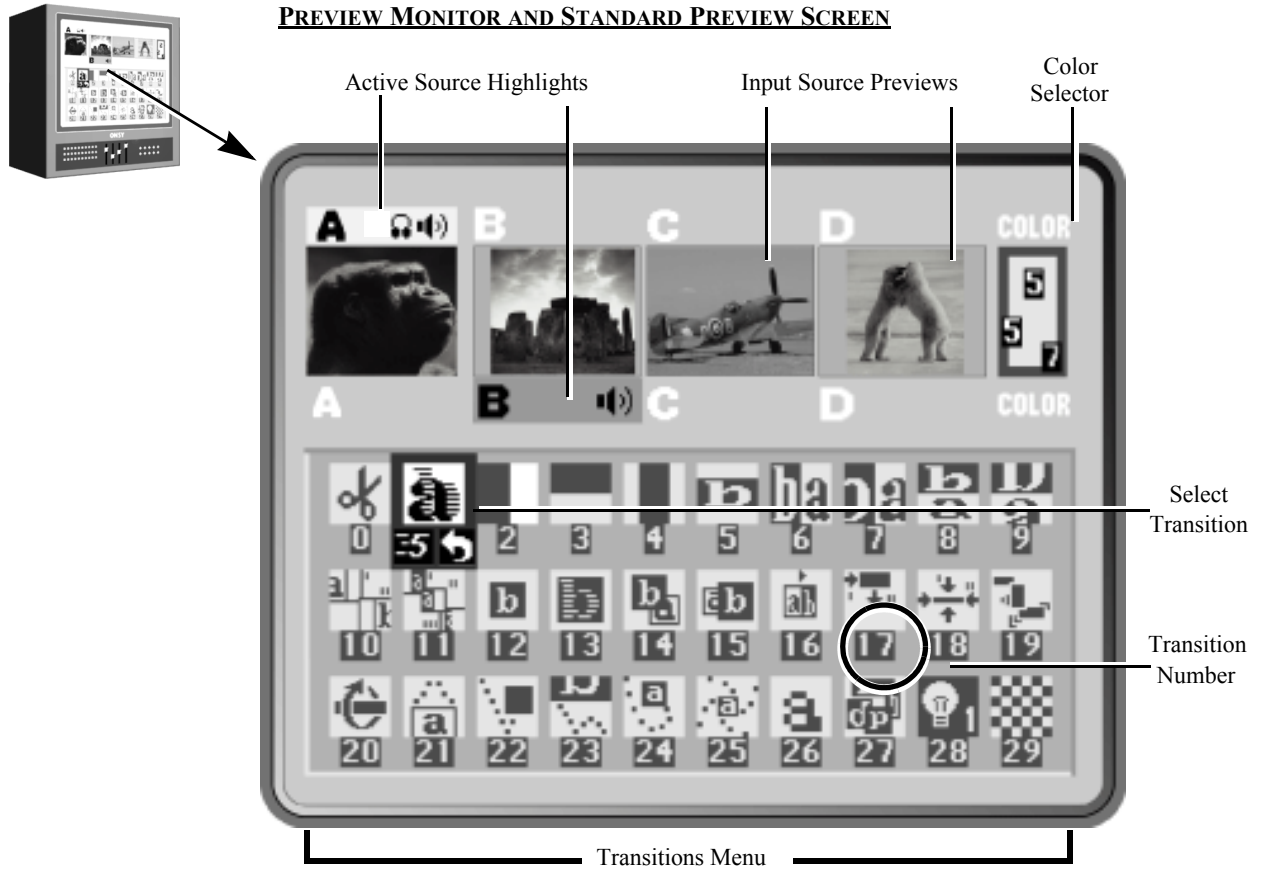
The MX-4 DV always processes the output at the highest possible quality. The Input Source Previews, however, appear in reduced quality because the MX-4 DV must reduce the images to fit the smaller window. What you see on the Preview screen is *not* indicative of what gets recorded or displayed on the output.

Changing the Display Configuration

Press the **DISPLAY** button to repeatedly cycle through five different configurations for the Preview screen, or use the shortcut key indicated for each:

- **Standard** — (**SHIFT+1**) Shows preview images for all four input sources and up to 30 different transition options (as shown above).
- **Two Channel** — (**SHIFT+2**) Shows only enlarged CURRENT and NEXT input source Previews and two rows of the Transitions menu.
- **Full** – (**SHIFT+3**) Displays only the input source Preview windows, each in a larger size. Transitions menu not displayed.

- **Next** — (**SHIFT+4**) Displays full-screen image of the NEXT input source. Transitions menu not displayed.

- **Current** — (**SHIFT+5**) Displays full-screen image of the CURRENT input source. Transitions menu not displayed.

Refer to "Display" beginning on page 69 for more information. Unless stated otherwise, this guide assumes you are using the **Standard** preview.

Input Source Previews

A small, preview image from each input source appears in a separate window. Use the previews to direct the action, position cameras, find a particular sequence on a video tape, and so forth. Input effects can be viewed in the preview thumbnail images.

Active Source Highlights

You can have up to four input sources. The MX-4 DV labels the sources A, B, C, and D. (There is also a fifth, built-in source — the mixer's own background color generator.) All transitions start with one source, called the CURRENT source, and end with another, called the NEXT source.

Colored highlights help identify one video source from another. Yellow highlights the CURRENT video source (above the preview image), and green highlights the NEXT video source (below it).

The speaker icon (rather than a colored highlight) indicates the CURRENT and NEXT audio selections.

The headpins icon identifies the channel to which the headphone output is currently directed.

In addition to the highlights described above, indicator lights between the **CUT** and **NEXT** buttons indicate the currently selected video sources.

A steady light identifies the CURRENT video source. A blinking light identifies the NEXT video source.
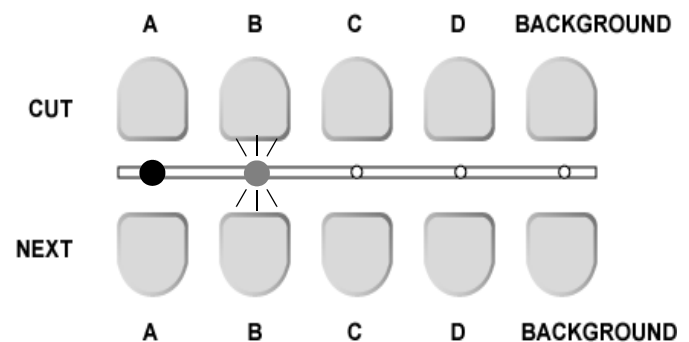
Brief descriptions of the Transitions Menu, Highlights, and Indicators follow. For more detailed information, refer to Chapter 5, *Transitions*.

Color Selector

The Color Selector shows current choices for background color, border color, and border style. The selector shows the actual colors, and the numeric values associated with each. This example shows a background color 5, border color 7, and border style 5.

Background
Color

Border
Style
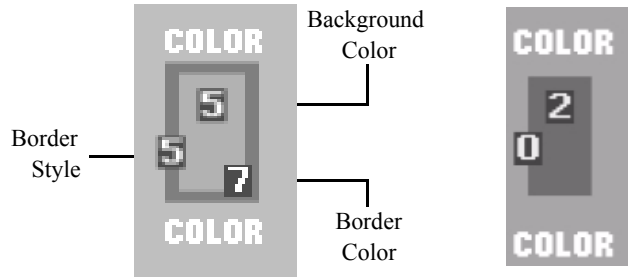
Border
Color

If you turn off the border (that is, set the border style to zero), the border color swatch and number do *not* appear in the Color Selector. However, the border style number (which is 0) is shown.

You can cycle through all available colors for each component using the **BG COLOR**, **BORDER COLOR**, and **BORDER STYLE** buttons. Refer to "Working with Colors" beginning on page 41.

Transitions Menu

The Transitions menu shows up to 30 transitions at a time. The MX-4 DV groups the 700+ available transitions into categories.

To access any transition category, press the appropriate transition category button.

USER   BASIC   EDGES   SHAPES   MISC.
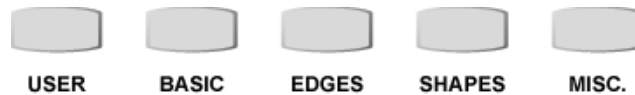
Refer to "Transition Categories and Menus" beginning on page 50 and Appendix A, *Transitions List*, for detailed information.

Use the **ARROW** keys to navigate through the transitions in the current menu. If a category contains more transitions than can appear in the Transitions menu at one time, continue pressing **DOWN ARROW** or **UP ARROW** to scroll the other transitions into the menu. When the transition you want appears in the Transitions menu, use the **ARROW** keys to select (or, highlight) it.

Selected Transition

When you select a transition in the menu, the MX-4 DV highlights it in blue. It also shows the current speed and direction for the transition. In this example, speed is 5 and the direction is forward (as indicated by the arrow).

You can change the speed at which a transition runs, and you can also change the direction in which it runs. Refer to "Adjusting Transitions" beginning on page 56.

Using CURRENT and NEXT Sources

The concept of CURRENT and NEXT sources is fundamental to MX-4 DV operations. As you go about creating productions, you always have a CURRENT and NEXT source.

Example…

Suppose you want to create a sequence of transitions from Kong's thoughtful gaze to footage of a fighter plane contemplating take off and, finally, a shot of Stonehenge for a mystic closing.

CURRENT ⟶ NEXT

Source **A**   Source **B**   Source **C**
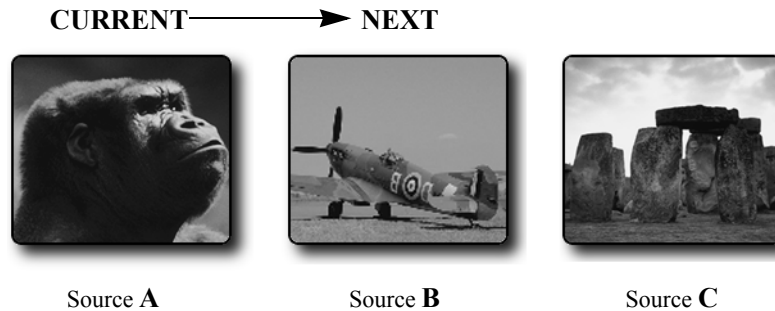
To identify the CURRENT and NEXT sources:

1   Begin with the footage of Kong. Press **CUT/A** to make this (Source A) the CURRENT source.

2   Press **NEXT/B** to make the fighter plane (Source B) the NEXT source.

3   Select a transition to use when switching from the CURRENT to NEXT source, such as a right-to-left wipe.

Use the **ARROW** keys to highlight the transition in the Transitions Menu. Refer to "Selecting Transitions" beginning on page 54 for additional methods of selecting transitions.

4   Roll the CURRENT source to the spot where the transition should run, then press **PLAY**.

Immediately upon completion of the transition, the MX-4 DV makes the CURRENT source (Kong) the NEXT source, and makes the NEXT source (the fighter plane) the CURRENT source.

✔ TIP

You can use this automatic swapping of CURRENT to NEXT and vice versa to your advantage. When you want to cut back and forth between only two sources, the automatic swapping always selects the next source for you.

For this procedure, however, you need to make Stonehenge the NEXT source so that when transitioning out of the fighter plane, Stonehenge comes on screen.

5   Press **NEXT/C** to select Stonehenge as the NEXT input source.

CURRENT ⟶ NEXT

Source **A**   Source **B**   Source **C**
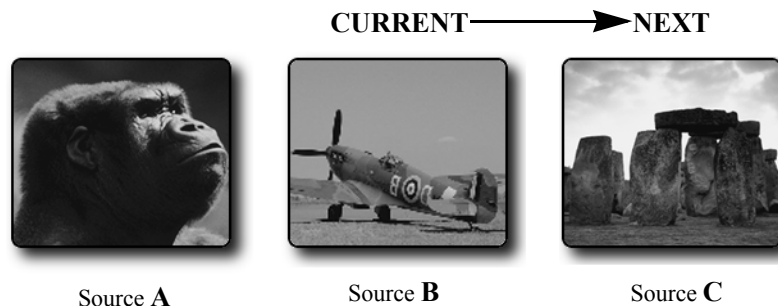
6   Select a transition to use this time to switch from CURRENT to NEXT source, such as a slow dissolve. The CURRENT source (the fighter plane) continues running, and continues to appear on the output device.

7   To transition to Stonehenge, hold down the **SHIFT** button and move the **T-BAR** to the bottom of its slot, release the **SHIFT** key, then swing the **T-BAR** upwards at whatever speed you want the dissolve to happen.

The **T-BAR** and the **PLAY** button run the same transition, except that the **T-BAR** lets you manually control the speed at which the transition runs.

SELECTING SOURCES

Now that you understand the distinction between the CURRENT and NEXT source, you need to know how to select sources for each. Use the **CUT** and **NEXT** buttons on the MX-4 DV keyboard to select sources.
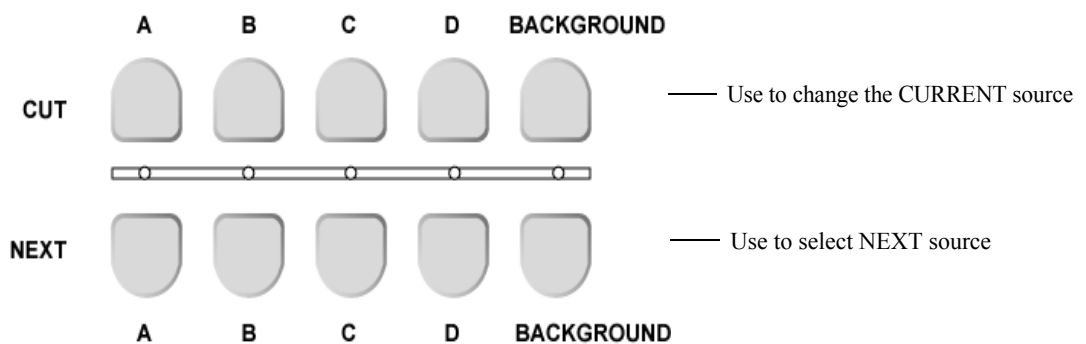
Use the **CUT** buttons to select the CURRENT source. The four buttons labeled **A**, **B**, **C**, and **D** correspond directly to the Input Source Previews on the Preview Screen (refer to page 36) and to the MX-4 DV's four channels. Use the **BACKGROUND** button to select a solid color background rather than an image coming from a source device (refer to "Using Color Backgrounds" on page 42). When you press any **CUT** button, the output video cuts to the new source and the indicator light *below* the **CUT** button glows steadily.

After selecting the CURRENT source, use the **NEXT** buttons to select the NEXT source. The buttons are labeled the same as the **CUT** buttons. When you press any **NEXT** button, the indicator light *above* that button flashes.

USING THE VIDEO/AUDIO SELECTOR

The **VIDEO/AUDIO** selector controls which parts of the input signal get used from any given source.

You can set the **VIDEO/AUDIO** selector to any of three positions — **VIDEO** only, **AUDIO** only, or both. Press the button as required to turn on the Video, Audio, or both lights.

VIDEO – Video changes, audio does not. Video light only is illuminated.

AUDIO – Audio changes, video does not. Audio light only is illuminated.

BOTH – Audio and Video both change. Both the video and audio lights are illuminated.

Many sources (such as pre-recorded video tapes) carry both video and audio signals. Other input sources (such as a compact disc player) carry only audio signals, and some sources carry only video signals.

Example…

　　You are producing a documentary on hot air ballooning. You want to over-dub the video footage of hot air balloons with a narrative audio track. Using the VIDEO/AUDIO selector you can process only the video from the VCR and combine it with the audio from an audio tape containing the voice-over material.

To do this type of mixing:

1 Connect the VCR to one of the MX-4 DV inputs on the rear panel, such as set number one.

2 Connect the audio tape deck to a different set of inputs, such as set number two.

3 Press **CUT/A** to select the VCR input.

4 Press the **VIDEO/AUDIO** selector until only the **VIDEO** light is on

5 Press **CUT/B** to select the audio deck input.

6 Press the **VIDEO/AUDIO** selector until only the **AUDIO** light is on.

7 Press **CUT/A** to make it the CURRENT source, then press **NEXT/B** to make it the NEXT source.

8 Start both input devices rolling.

9 Press **PLAY** to begin outputting the program.

NOTE

To designate any part of a signal with the video/audio selector, an input device must be set up accordingly. For example, to process only the audio signal from a video tape in a VCR, the VCR's audio output must be connected to the MX-4 DV's audio input jacks. Refer to Chapter 3, Installing the MX-4 DV and also refer to "Route" on page 73.

SWAPPING SOURCES

This section discusses common ways to switch between source devices.

Simple Cuts

To switch to a specific source, press the **CUT** button for that source. The **CUT** buttons cause the switch to occur almost immediately. For example, press **CUT/A** to immediately switch to that input. You don't need to press **PLAY** or use the **T-BAR** when you use the **CUT** buttons.

To immediately switch to a colored background, press **CUT/BACKGROUND**. The MX-4 DV displays the currently selected background color on the output. Set the background color to the color you want *before* pressing **CUT/BACKGROUND**. Refer to "Working with Colors" beginning on page 41 for further instructions.

Swapping Between Two Sources

To switch back and forth between two sources, use the **PLAY** button to automatically switch between the two.

TIP

When using this back-and-forth switching process, you might find it helpful to use the TWO CHANNEL mode (SHIFT+2) for the Preview screen. Refer to "Display" beginning on page 69.

To switch sources using this method:

1   Press the **CUT** button for the source with which you want to begin — for example, press **CUT/A**.

2   Press the **NEXT** button for the other source — for example, press **NEXT/B**.

3   Use the **ARROW** keys to highlight and select a transition, or enter the transition number on the numeric keypad. Press **OK**.

   When you need a very quick switch between sources — such as when doing a live broadcast of two individuals debating — use the Cut transition (zero).

4   Roll the input sources.

5   To run the transition, press **PLAY**. At this point, the MX-4 DV switches the sources — source A becomes the NEXT source, and source B becomes the CURRENT source.

6   To switch between sources A and B, press **PLAY** again.

Working with Colors

Common uses for color include solid colored backgrounds and colored borders around objects. So, you need to know how to choose colors and identify those you've chosen.

The MX-4 DV gives each color a unique number ranging from 0 (zero) to 9. The following table defines these colors and their code numbers.

Table 2: Default Colors and Numbers

CODE	COLOR	CODE	COLOR
0	Black[a]	5	Green
1	White	6	Bright Blue
2	Gray	7	Light Blue
3	Red	8	Purple
4	Yellow	9	Medium Blue-Green

   a. You cannot modify Black (color code 0).

The maximum number of colors in the MX-4 DV palette is ten. You can change nine of the ten colors. You cannot change color 0 (black).

Identifying Colors

Background Color

Border Style
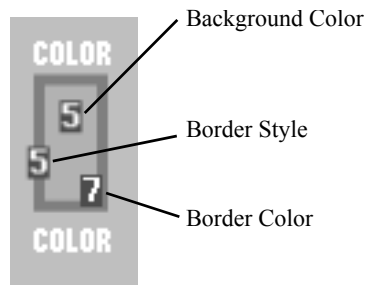
Border Color

The **Color Selector** appears in the upper-right corner of the Preview screen. It indicates colors selected for the background and borders as well as border style.

The inner-most rectangle shows a sample of color assigned to the background as well as the color number. The border around the rectangle shows both the current border style and color and their associated color and style codes.

Using Color Backgrounds

Colored backgrounds have many uses. For example, to dissolve to a solid black background when transitioning out of the CURRENT source, hold the black for a moment or two, then dissolve from the black background into the NEXT source.

✔ TIP

Use the solid color background to lay down ten seconds of black at the beginning of your video.

Transition into and out of solid colored backgrounds basically the same way as transitioning between sources. The difference is that you must select the background color you want to use *before* running the transition.

To make the selection:

1   Press **BG COLOR** until the color you want appears in the Color Selector.

2   To immediately cut to the colored background, press **CUT/BACKGROUND**.

To transition into the colored background, press **NEXT/BACKGROUND,** then press **PLAY** or use the **T-BAR** to switch to the colored background.

Changing Colors and Styles

Use the **BG COLOR**, **BORDER COLOR**, and **BORDER STYLE** buttons to change colors and styles. In each case, press the button repeatedly to cycle through all of the available options for that particular setting.

BG COLOR

BORDER COLOR
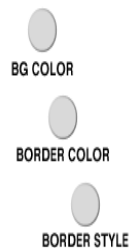
BORDER STYLE

The following sections describe the **BG COLOR, BORDER COLOR** *, and* **BORDER STYLE** *buttons.*

If you already know the color number of the color you want to assign:

1   Press and hold either **BG COLOR** or **BORDER COLOR**, depending on which you want to change.

2   Enter the color number on the numeric keypad. For example, press and hold **BG COLOR**, then press **6** to specify bright blue.

Creating Custom Colors

You can change any color *other than color 0 (black)* (refer to Table 2 on page 41) to create custom colors. You cannot add more colors, but you can change the existing ones. Once you create a custom color, it stays permanently in the MX-4 DV unit until and unless you change it again.

BG COLOR and **BORDER COLOR** share the color palette. Therefore, changing any color affects both the background and border colors.

To create a custom color:
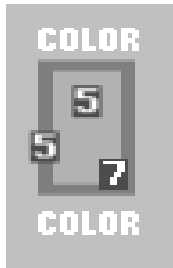
1 Press **BG COLOR** or **BORDER COLOR** until the color you want to change appears in the Color Selector.

2 Press **LEARN+BG COLOR** or **LEARN+BORDER COLOR** (depending on which one you want to change).

These key combinations activate Learn Color mode. The MX-4 DV blinks the **VIDEO/AUDIO** selector lights to indicate you are in the proper mode.

3 Use the **JOYSTICK** and **T-BAR** in combination to define the new color.

     a   Move the **T-BAR** up and down its slot to adjust luminance.

     b   You can use the **SHIFT+ARROW KEYS** for fine adjustment to luminance.

     c   Move the **JOYSTICK** relative to its color ring to adjust chrominance (or color value).

     d   You can use the arrow keys for fine adjustments to chrominance.
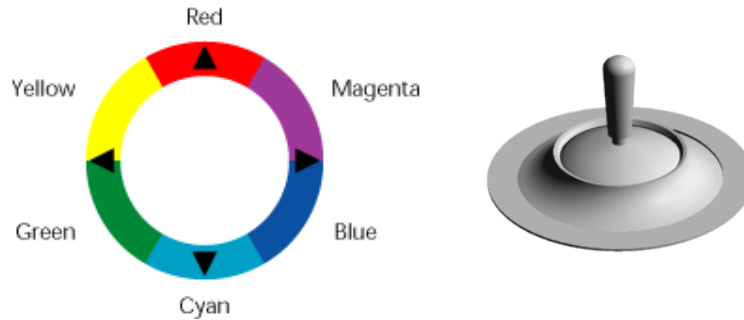
4 When the color you want appears in the Color Selector, press **OK**. You exit from Learn Color mode and the **VIDEO/AUDIO** lights cease blinking.

If you decide you don't want to change the color after manipulating the **JOYSTICK** and **T-BAR**, press **SHIFT+0** (zero) to revert back to the original color. The MX-4 DV restores the original color and exits from Learn Color mode (the **VIDEO/AUDIO** lights cease blinking).

USING BORDERS

Borders have many uses, such as providing a distinct separation between two sources while running a transition.

Wipe Transition
No Border

Wipe Transition
White Border

You can also use borders to frame images in a picture-in-picture (PIP) image, and so forth. Whatever purpose you use a border for, you can specify the color and style for the border.

To specify border color:

• Repeatedly press **BORDER COLOR** to cycle through the available colors. The Color Selector shows the current color.

Press **BORDER STYLE+0** (zero) to immediately turn off the border.

To specify border style:

• Repeatedly press **BORDER STYLE** to cycle through the available styles. The Border Style indicator in the Color Selector increments by one each time you press the button. You can specify ten different styles (0 through 9).

Table 3: Border Styles (Defaults)

No.	Result	Notes
0	Border and Edges Off	
1-3	Soft Edge Border	Use **LEARN+UP/DOWN ARROW** keys to soften and harden border edges.
4-6	Colored Border	**LEARN+RIGHT/LEFT ARROW** keys adjust border width. **LEARN+UP/DOWN ARROW** keys soften the border.
7-9	Drop Shadow Border	**LEARN+ARROW** keys reposition drop shadow.

Changing Border Styles

This section explains how to specify different edges, color borders, and drop shadows to use in conjunction with border styles.

To change a border style setting

1 While the Preview screen is displayed, enter **BORDER STYLE+#** — where # can range from 1 to 9 (inclusive) and is the number of the border style you want to change, as shown in the preceding table.

2 Select the shape or edge to which you want to add a border or shadow by selecting an appropriate transition.

✅ TIP

Try using transitions 300-305 for edges and 554-562 for shapes.

3 Move the **T-BAR** to its mid point.

4 Press **LEARN+BORDER STYLE** to cycle between soft edge, color border or drop shadow.

✅ TIP

Make note of the border style number you are changing for future reference.
You can also use PIP to select and modify border styles for shapes.

5 Use **LEARN+ARROW KEYS** (as indicated in Table 4, "Keys for Changing Border Attributes," on page 45, below) to specify what you want to change – width, softness, or position.

6 Return the **T-BAR** to its full up or full down position.

The MX-4 DV automatically stores the border style so that it is available until and unless you change it again.

Table 4: Keys for Changing Border Attributes

FUNCTION	KEY COMBINATION
Toggle through Soft Edges, Color Border, and Drop Shadow	**LEARN+BORDER STYLE**
Soft Edges	
Increase Softness	**LEARN+UP ARROW**
Decrease Softness	**LEARN+DOWN ARROW**
Color Border	
Increase border thickness	**LEARN+RIGHT ARROW**
Decrease border thickness	**LEARN+LEFT ARROW**
Increase border softness	**LEARN+UP ARROW**
Decrease border softness	**LEARN+DOWN ARROW**
Drop Shadow[a]	
Move shadow right	**LEARN+RIGHT ARROW**
Move shadow left	**LEARN+LEFT ARROW**
Move shadow up	**LEARN+UP ARROW**
Move shadow down	**LEARN+DOWN ARROW**

a. Drop Shadows created for edges do not translate well to shapes, and vice-versa. Therefore, you should specify one set of drop shadow styles for shapes and another for edges.

NOTES

TRANSITIONS

The **MX-4 DV** contains over 700 transitions from which you can choose. Furthermore, you can manually control any transition to change the way it works, thereby creating your own versions of the supplied set.

Transitions artistically switch from one scene to the next in a production. The MX-4 DV transitions range from simple cuts, dissolves, and wipes to sophisticated zooms, fly-ins, and flips. You can change the speed (either manually or automatically) at which transitions run, and run them in reverse. Combine these features for many different variations.

In this chapter you'll learn about:

- Basic transition concepts – what is a transition and how to use it
- Transition Categories and Menus
- Selecting Sources to use during Transitions
- Selecting Transitions
- Adjusting Transitions
- Running Transitions

BASIC TRANSITION CONCEPTS

Transitions create on-screen effects used when switching from one source to another (that is, one scene to another). The most basic type of transition is the *cut*, where the first frame from the NEXT source immediately replaces the last frame from the CURRENT source. Cuts produce abrupt changes. Other types of transitions use special effects to produce a smoother, more artistic change from one source to the next. The following illustration shows a horizontal wipe transition.

CURRENT   Transition in Progress   NEXT

a ———   ——— **b**
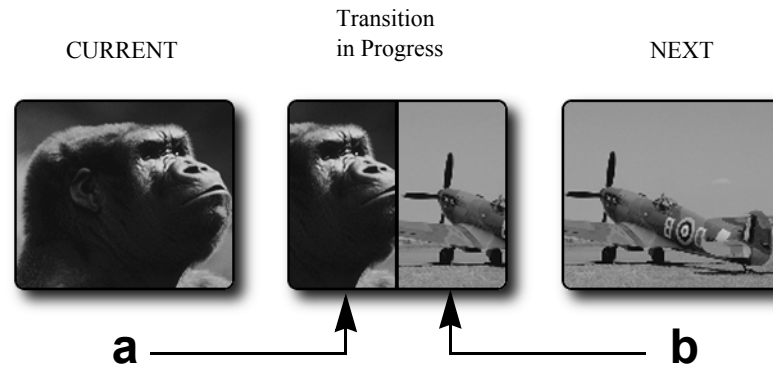
> ⓘ NOTE
>
> When discussing transitions, we use the letters **a** and **b** to differentiate the beginning scene (**a**) from the ending scene (**b**). These letters often appear in the transition icons to indicate the direction in which the transition travels. These letter indicators have **no relationship** to the A, B, C, and D letters used to differentiate between the MX-4 DV channels.

The following basic steps explain how to run a transition with the MX-4 DV. Each step is described in more detail later in this chapter.

To run a transition:

1   Display the CURRENT source on the output screen. For example, press **CUT/A** to make A the current source.

2   Select the NEXT source — the one you want to appear on the output following the transition. For example, press **NEXT/B** to make that the next source.

Highlights above and below the source previews indicate CURRENT and NEXT sources, respectively.
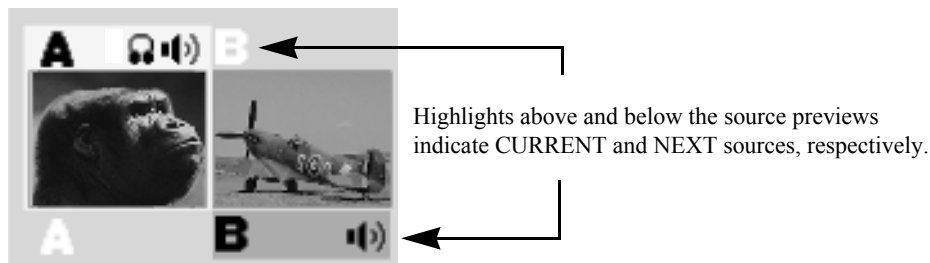
3   Select a transition to use. For example, press the **BASIC** Transition Category button, then select a wipe transition from the menu.

4   Prepare the sources (such as VCRs and camcorders) and let them roll.

5   At the right moment, use either the **T-BAR** or the **PLAY** button to run the transition.

As you can see, you first set up the transition, then execute it. Nothing happens until you use the **T-BAR** or **PLAY** button to run the transition. So, you set everything up, then run the transition at the precise moment you want it to occur. As soon as one transition finishes, immediately set up the next one so that all you have to do is press **PLAY** or use the **T-BAR** to proceed.

You can select the CURRENT source, the NEXT source, and the transition in any order, and change them as many times as necessary before actually running the transition.

At the completion of the transition, the CURRENT and NEXT sources swap places — that is, CURRENT becomes NEXT, and NEXT becomes CURRENT.
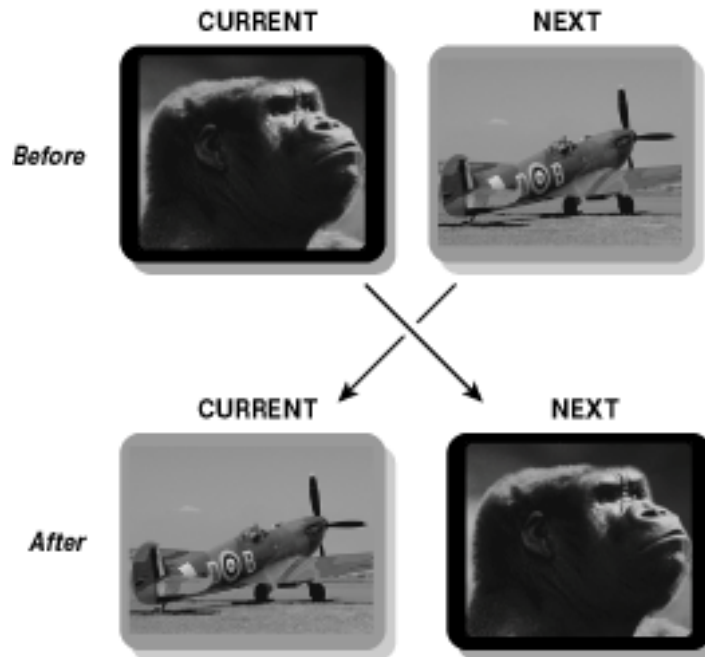
At this point, you can do one of the following:

• Leave the CURRENT and NEXT sources as they are and switch back and forth between them; or,

• Select a new NEXT source and, optionally, a new transition, then repeat the process.

TRANSITION CATEGORIES AND MENUS

To help manage the 700+ transitions, the MX-4 DV separates them into five logical categories — User, Basic, Edges, Shapes, and Misc. Use the Transition Category buttons to access the different categories.

Transition Category Buttons

USER   BASIC   EDGES   SHAPES   MISC.

When you press a Transition Category button, MX-4 DV displays the transitions available in that category in the Transitions Menu. The content of the menu differs depending on which category you select. However, the menus have a common structure and always appear in the same place.

The content of the Transitions Menu differs depending on the Category selected.
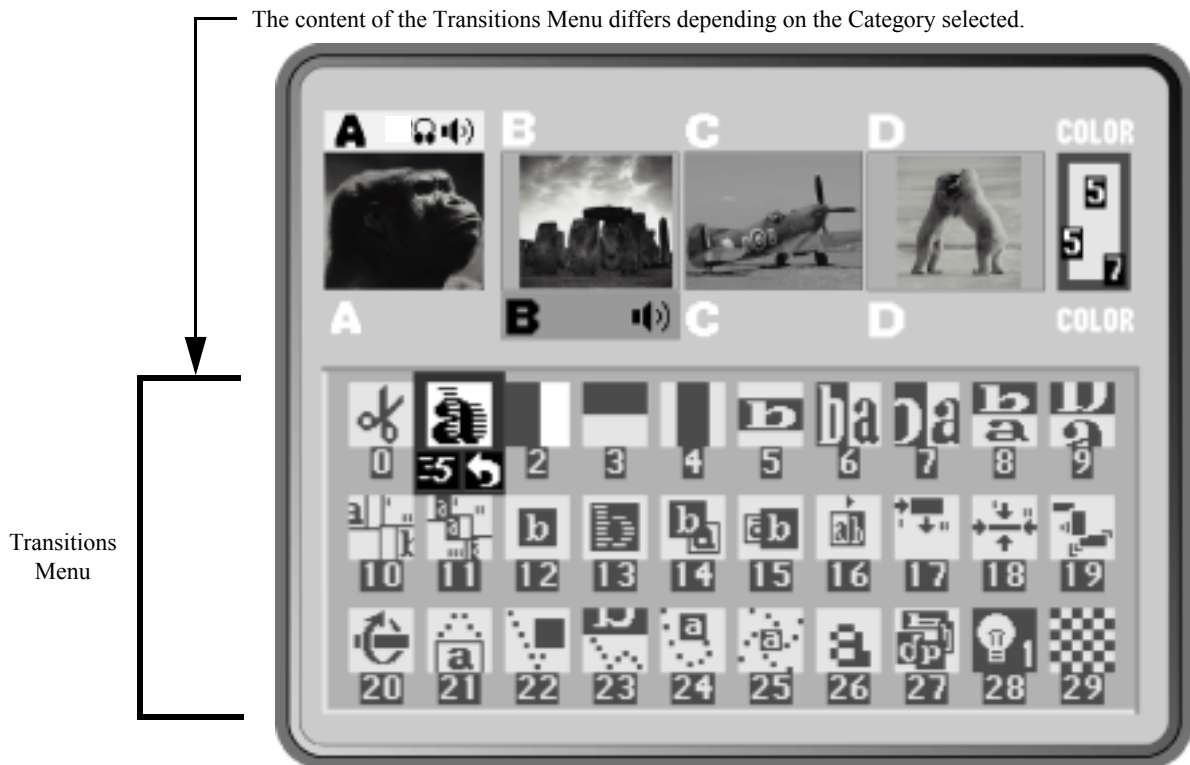
Transitions Menu

ℹ NOTE

The Transitions Menu does *not* appear when you work with the Full, Current, or Next Preview screen. Refer to "Display" beginning on page 69 for more information.

Use the **ARROW** keys to navigate the Transitions Menu. If the category contains more transitions than can appear in the menu at one time, use the **UP** and **DOWN ARROW** keys to scroll through them. You can scroll through only those transitions in the current category.

The MX-4 DV color codes the transition icons in the menu:

Basic	White
Edges	Blue
Misc.	Yellow
Shapes	Red

Basic Transitions Category

This category includes common transitions, such as wipes and dissolves. The transitions in this category are color coded white. Refer to page 136 for samples.

MXProDV Compatibility If you are upgrading to the MX-4 DV from the Videonics MXProDV Video Mixer, the transitions in the basic category are the same as the MXProDV except for 60 new transitions.

The MX-4 DV provides a set of hot keys that directly correspond to the MX-4 DV buttons. Using the hot keys (in the following table) causes the MX-4 DV Preview screen cursor to appear at the beginning of each section within the basic category.

Table 5: MX-4 DV Compatibility Hot Keys

FUNCTION	MX-4 HOT KEY
Fades and Dissolves	**SHIFT+BASIC**
Wipes	**SHIFT+EDGES**
Zooms	**SHIFT+MISC.**
Flips	**SHIFT+SHAPES**

Edges Transitions Category

These transitions move a curved or jagged edge across the screen when transitioning to a different picture source. Transitions in this category are color coded blue. Refer to page 144 for samples.

Misc. Transitions Category

The transitions in this category move cutout and compression images across the screen as a change occurs. The cutout images and compression images go away once the transition finishes. Transitions in this category are color coded yellow. Refer to page 145 for samples.

Shapes Transitions Category

These transitions occur as a wipe in the shape of a geometric object, such as a heart, a five-pointed star, and so forth. Transitions are color coded red. Refer to page 146.

User Transitions Category

It's *unlikely* you'll use all of the available transitions — but it is *likely* that you'll have a limited set you use most of the time. With this in mind, the MX-4 DV makes it easy for you to access your favorite transitions by creating your own personal menu — the User menu. The MX-4 DV comes with a default set, but you can change them to tailor the User menu to your preferences and needs.

> ⚡ TIP
>
> *During production planning, determine which transitions you want to use, then set up the User category to contain those transitions. This gives you quick, immediate access to the transitions without having to search through the other categories. See the following section ("Changing User Transitions Menu") to learn how to tailor the menu to your preferences.*

CHANGING USER TRANSITIONS MENU

The first time you power up the MX-4 DV and press the **USER** Transitions Category button, the default transitions appear in the menu. The default set contains a variety of transitions from the other four categories, as defined by FOCUS Enhancements at the factory. If you are satisfied with the default set, there is no need to change them.

The **USER** category does not contain distinct transitions – that is, all transitions in the **USER** category actually exist in other categories (basic, edges, shapes, and misc.). Think of the **USER** category as a collection of references to other transitions.

You can change as many transitions in the **USER** menu as you want.

To change a transition in the User menu:

1   Decide which transition you want to add to the **USER** category. Refer to Appendix A, *Transitions List*, for a list of valid numbers and their associated transitions.

2   If necessary, press **DISPLAY** to set the Preview screen to Standard or Two Channel mode.

In the other Preview modes (Full, Current, or Next), the MX-4 DV does not display the Transitions Menu. Refer to "Display" beginning on page 73.

3   Press the **USER** Transition Category button to display the menu on the Preview screen.

4   Use the **ARROW** keys to highlight the transition you want to replace in the **USER** category.

5   Enter the number of the transition you selected in step 1, above. You can enter the number of any transition from any category.

6   Press **OK**.

Restoring Default User Transitions   You can easily restore the default set of transitions in the User category. NOTE: By pressing **#+OK** you can also set a transition in the User menu.

To restore the default set of transition to the User menu:

1   If necessary, press the **USER** Transition Category button to display that menu on the Preview screen.

2   Enter **SHIFT+0** (zero). This restores the default set of transitions for this category.

SELECTING TRANSITION SOURCES

An important step in setting up a transition is to identify the CURRENT and NEXT sources. Use **CUT** and **NEXT** to choose the two sources. The MX-4 DV provides feedback in a couple of different ways to confirm your choices.

Selecting Sources and Getting Feedback

The lights between the rows of **CUT** and **NEXT** buttons act as indicators. A *steady* light identifies the CURRENT source (A) – a *flashing* light identifies the NEXT source (C).

Yellow highlights the CURRENT source (A)

Green highlights the NEXT source (C)
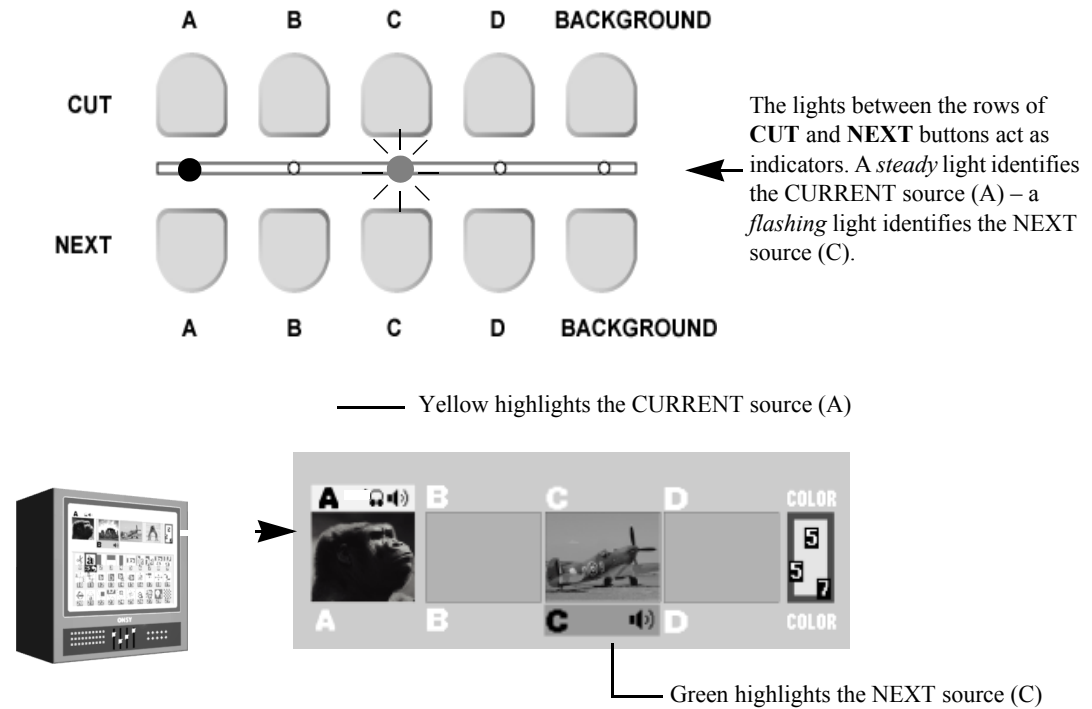
The MX-4 DV identifies the CURRENT source by a **yellow highlight** on the Preview screen and a **steady light** beneath the corresponding **CUT** button. It identifies the NEXT source by a **green highlight** on the Preview screen and a **flashing light** above the corresponding **NEXT** button.

If you make CURRENT and NEXT the same source, the source light (between the two rows of buttons) flashes as though it were just the NEXT source.

Setting the CURRENT Source

In many cases you don't need to select the CURRENT source because the ending source from the previous transition automatically becomes the new CURRENT source (refer to the diagram on page 49). However, if you want to change the CURRENT source, press the corresponding cut button. For example, pressing **CUT/D** makes D the CURRENT source, and the Program monitor immediately displays D's signal.

Setting the NEXT Source

To specify the NEXT source, press the corresponding **NEXT** button. For example, to make D the next source, press **NEXT/D**.

SELECTING TRANSITIONS

To select a transition to use between the CURRENT and NEXT sources, do one of the following:

- Use the **ARROW** keys to select from the Transitions Menu on the Preview screen; or,

- Enter the transition's assigned number on the MX-4 DV numeric keypad, then press **OK**.

Use **ARROW** keys to select a transition from the Transition Menu on the Preview Screen…

or

…enter the transition number on the keypad…

then press **OK**.

Preview Screen

Numeric Keypad
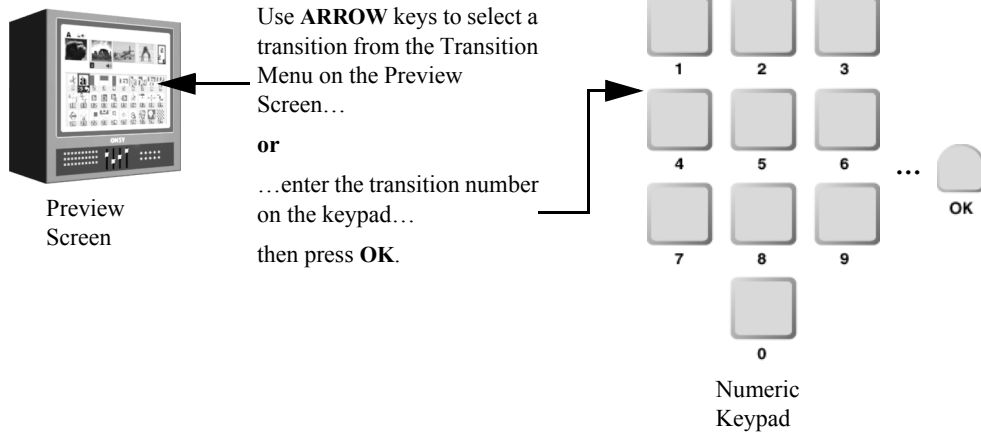
NOTE

When selecting from the user category, you must always use the arrow keys to select a transition from the Transition Menu on the Preview screen. Entering a transition number and pressing ok replaces the current transition with the one you select.

Using the Transitions Menu

The Transitions menu appears just below the preview images on the Preview screen when you set the Preview to Standard or Two Channel mode (refer to "Display" beginning on page 69 for more information about Preview modes).

Blue highlights the selected transition

Each icon in the menu represents one transition.
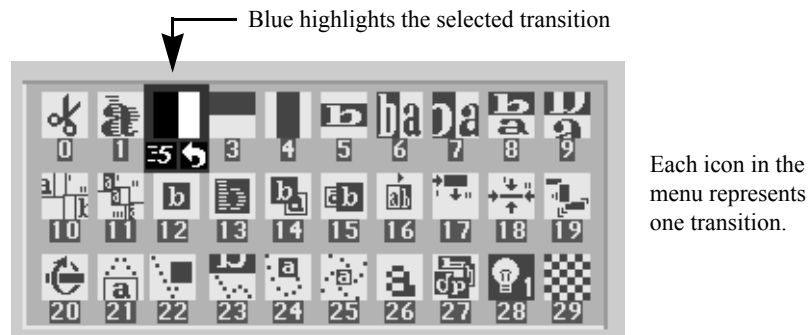
To select a transition from the Transitions Menu:

1   If necessary, press the appropriate Transition Category button to display the set of transitions containing the one you want.

2   Use the **ARROW** keys to highlight the transition you want to use.

Blue highlights the currently selected transition. Use the **LEFT** and **RIGHT ARROWS** to move the highlight horizontally. Use the **UP** and **DOWN ARROWS** to move the highlight vertically. When you reach the bottom row of icons in the current menu, press **DOWN** arrow to display additional transitions in the category, if present.

Using Transition Numbers

Every transition has a number assigned for reference and identification. The number appears in the Transitions Menu just below each transition icon.

The transition number…
in this example, number 14

To select a transition using transition numbers:

1   Enter the transition number on the keyboard.

2   Press **OK**.

To immediately play back the transition, press **PLAY** rather than **OK**.

Refer to Appendix A, *Transitions List*, for a complete listing of transitions and their assigned numbers.

If you make a mistake entering a number, press **OK**, enter the number correctly, then press **OK** again.

ⓘ NOTE

When you highlight a transition in a Transitions menu, the highlighting obscures the transition number. The number below the transition icon represents the speed at which the transition plays. The following section, "Adjusting Transitions" discusses this.

ADJUSTING TRANSITIONS

Every transition runs at a pre-set speed and direction. Symbols appear below the transition icon in the Transitions Menu indicating the current speed and direction.

Transition Icon ⟶

Transition Speed ⟶   ⟵ Transition Direction
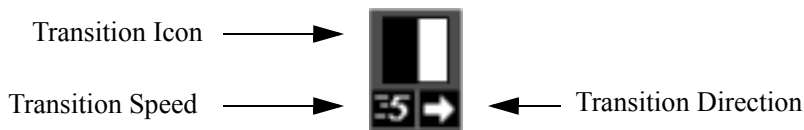
Use the **SPEED** and **REVERSE** buttons to change the speed and/or direction of a transition.

Transition Direction ⟶

REVERSE

⟵ Transition Speed
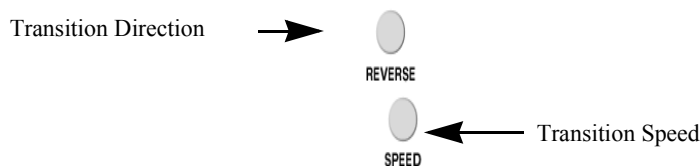
SPEED

> ℹ **NOTE**
>
> When you change a transition's speed and/or direction, **the change applies to all other transitions until you specifically change it**. For example, if you set the speed of the current transition to 4, all subsequent transitions run at this same speed until you again change the speed factor. This also applies to transition direction.

Changing Transition Speed

Transition speed values can range from 0 (slowest) to 9 (fastest).

To change the transition's speed:

• Press **SPEED**. Each press increases the speed by one unit. Press **SHIFT+SPEED** to decrease the speed by one unit.

The MX-4 DV changes the Transition Speed indicator below the transition icon to the currently selected value. You can change the speed any time either prior to running the transition, or while it runs (which allows you to make adjustments "on the fly.")

> ✓ **TIP**
>
> *To directly set the speed to a specific value, press and hold the SPEED button while entering a value from 0 to 9 on the numeric keypad.*

Changing Transition Direction

Transitions can run in two directions — forward and reverse. If you use the **PLAY** button, transitions run, by default, in the forward direction. If you use the **T-BAR**, moving it up runs the transition forward; moving it down runs it in reverse. For example, a simple wipe transition might move a vertical border across the screen from right-to-left or left-to-right, replacing scene **a** with scene **b**.

Example…

Suppose you're producing a video showing renovations to a building. Occasionally you want to go back and show how the building looked originally. When going back in time, use a wipe transition that moves from left-to-right. When going forward in time (to show the new modifications), reverse the wipe so that it moves from right-to-left.

To reverse a transition:

• Press **REVERSE**.

 Remember, all transitions run in reverse until you press **REVERSE** again. Reverse has no effect on a simple Cut or Dissolve transition because reversing those transitions produces no visible result.

MX-4 DV changes the Transition Direction indicator below the transition icon to the currently selected direction. When the arrow points **right**, the transition runs in its normal direction. When the arrow points **left**, the transition runs in reverse.

   Forward   Reverse

The Reverse function does *not* change the relationship between the sources. For example, a vertical wipe from source A to B moves from the top of the screen to the bottom, replacing source A with B. If you apply the Reverse function, source B still replaces A, but the transition wipes from the bottom of the screen to the top.

> ℹ️ NOTE ─────────────────────────────────
>
> Mosaic, dissolve, and misc. transitions work in only one direction at all times, including when you press **FREEZE** before running the transition.
>
> You cannot run Misc.-type transitions in a reverse direction. If you select a Misc.-type transition, then move the **T-BAR** from its *up* position to the *down* position, the MX-4 DV performs a simple dissolve (transition 160).

Using Auto-Reverse

Auto-Reverse automatically reverses the direction of transitions each time they run. In the previous building renovation example, you press **REVERSE** at the conclusion of each transition to alternate between left-to-right and right-to-left wipes. When you use Auto-Reverse, the MX-4 DV handles switching automatically. For example, if the transition is set to run from left-to-right, it automatically alternates between left-to-right and right-to-left each time it runs.

To invoke the Auto-Reverse feature:

• Enter **SHIFT+REVERSE**.

With Auto-Reverse activated, the MX-4 DV displays a distinct arrow below the transition's icon in the Transitions Menu. To manually reverse the current direction even with Auto-Reverse activated, press **REVERSE** at any time.

   Auto-Reverse Forward   Auto-Reverse Backward

Auto-Reverse remains active until you press **SHIFT+REVERSE** again to go back to one-way transitions. Auto-Reverse has no effect on dissolve and Misc. transitions.

RUNNING TRANSITIONS

After selecting the CURRENT and NEXT sources and the transition to use, you can run the transition either *automatically* or *manually.*

- Use **PLAY** to run transitions **automatically,** when you want them to run smoothly and always the same way.

- Use the **T-BAR** to run transitions **manually,** when you want fine control over the way it runs. For example, you can make the transition speed up, slow down, or even reverse itself at any point.

> **ⓘ** NOTE ───────────────
>
> If you apply the strobe effect to a source, the MX-4 DV automatically turns it off while the transition runs (refer to "Strobe" on page 69).
>
> Running a Misc.-type transition *to* either the Background channel or a channel with no video source executes a simple dissolve (transition 160).

Running Transitions Automatically

To run a transition automatically at a predetermined speed:

- Press **PLAY**.

You can pause an automatic transition by pressing **PLAY** again. Each time you press the button, the transition alternately stops and starts until you finally allow it to finish. Although the transition pauses, the video continues to play.

Running Transitions Manually

Use the **T-BAR** to manually control transitions. You can change a transition's speed and reverse its direction.

Operating the T-BAR

The **T-BAR** operates as follows:

- Moving the **T-BAR** from the DOWN to UP position runs the transition *forward*.

- Moving the **T-BAR** from the UP to DOWN position runs the transition in *reverse*.

- Holding down the **SHIFT** button while moving the **T-BAR** disables **T-BAR** operation. Use this method to reposition the **T-BAR** without running a transition or effect.

INPUT EFFECTS

This chapter describes MX-4 DV Input Effects, that are available in the following button group on the MX-4 DV keyboard.
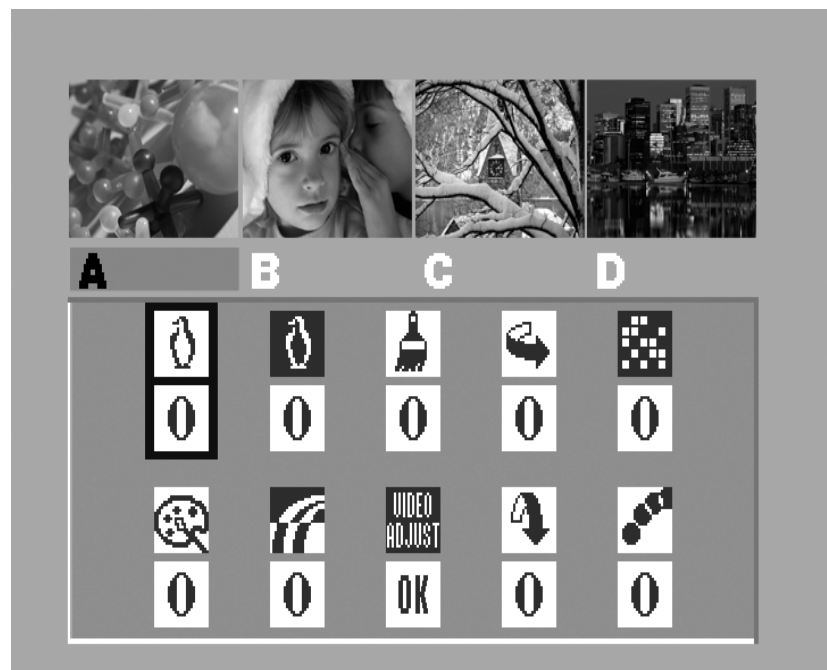
Use Input Effects in the following ways:

- Apply input effects to any source.
- Combine many different input effects to create entirely new effects.
- Apply input effects to some, none, or all sources, in any combination.
- With miscellaneous transitions.
- With multi-PIPs.
- In compose mode.

INPUT EFFECTS MENU

Press any input effects button to display the Input Effects Menu — or, press the **EFFECTS** button.

MX-4 DV updates the preview images to show Input Effects.
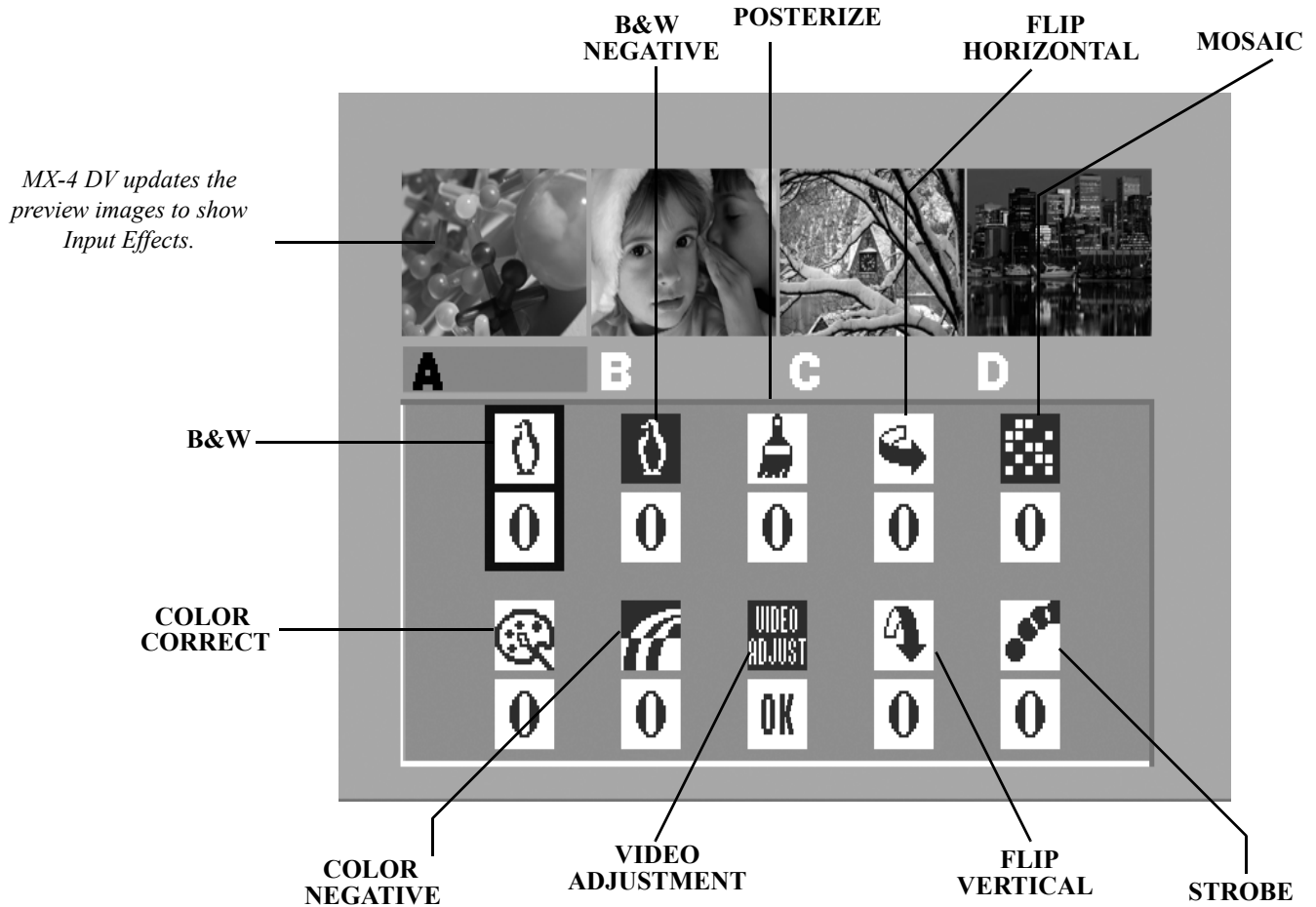
When you press one of the input effects buttons (such as **POSTERIZE**), the MX-4 DV automatically selects that effect in the menu. When you press the **INPUT EFFECTS** button, the MX-4 DV selects the first item in the menu — **B&W**.

ℹ NOTE

The menu does *not* contain an icon or settings for the chromakey option. When you press the **CHROMAKEY** button, the MX-4 DV takes you directly to the chromakey screen. Refer to Chapter 10, *Chromakey*, for details.

Special Key Combinations

Use the following key combinations while working with the Input Effects menu.

Table 6: Input Effects Mode Key Combinations

KEY COMBINATION	RESULT
ARROW keys	Moves cursor (or, highlight) between the different Input Effects.
Numeric Keypad	Directly sets the parameter value for the highlighted effect.
EFFECTS or **OK**	Exits from Input Effects mode.
EFFECTS buttons	Moves the cursor directly to that effect – for example, press **POSTERIZE** to highlight that effect: press **MOSAIC** to highlight that effect: and so on. If the selected effect matches the currently highlighted one on the Input Effects menu, pressing the **EFFECTS** button increments the effect's parameter value by one.
SHIFT+**0** (zero)	Resets all effects to 0 (off) for the selected channel.

When you are not working at the Input Effects menu, use the following key combinations.

Table 7: Main Mode Input Effects Key Combinations

KEY COMBINATION	RESULT
SHIFT+**EFFECTS** button	Increments the parameter value by one for the selected effect and applies it to the CURRENT source.
SHIFT+**EFFECTS**	Temporarily disables and re-enables Input Effects from being sent to Program out. Refer to the following paragraph.

When the Effects LED light is lit, Input Effects are *enabled*. The MX-4 DV applies the effects according to the parameter values for each effect.

When you use the **SHIFT**+**EFFECTS** key combination to *disable* Input Effects, the MX-4 DV turns off the LED light. It does not change any effects parameter values, but it does prevent the current Input Effects from being used. Press **SHIFT**+**EFFECTS** again to enable them.

USING INPUT EFFECTS

To apply a parameter value:

1   Press **EFFECTS** or one of the input effects buttons to display the Input Effects menu.

2   If you haven't already done so, use the **ARROW** keys or **EFFECTS** button to select the desired Input Effect to which you want to apply parameter values.

> *Please select a channel source before choosing an Input Effect.MX-4 DV.*

3   Set the parameter value to 0 (zero) to turn it OFF, or to 1 to turn it ON.

4   Use one of the **NEXT** buttons to select the source to which you want to apply the effect. For example, press **NEXT/B** to apply the effect to channel B.

5   Type the parameter value on the MX-4 DV numeric keypad, or continue pressing the corresponding effects key until the parameter value you want appears in the menu.

6   Press **OK** to exit from Input Effects mode.

7   You can also use the Input Effects Menu to access the Video Adjustment Menu for Brightness, Contrast, Color Saturation, and Hue. Use one of the **NEXT** buttons to select the source to which you want to apply the adjustments. Use the **ARROW** keys to select the Video Adjustment option. Press **OK** to go to the Video Adjustment Menu. You can also press **SHIFT+PLAY** to go straight to the Video Adjustment Menu from any other menu. To reset to the original factory settings, press the **SHIFT** then **OK** button.

8   Inside the Video Adjustment menu, select the proper video adjustment (Brightness, Contrast, Color Saturation, and Hue) with the **LEFT/RIGHT ARROW** keys. Once you have selected the video adjustment, make the proper adjustments with the **UP/DOWN ARROW** keys or with the **T-BAR** until you have achieved the desired effect. You can view all adjustments on the Preview screen.

The MX-4 DV stores the most recent set of input effects. Therefore, when you turn the unit off, then turn it back on again, the most recent selection of input effects is still active.

B&W

Changes the input picture to black and white. Removes all color from the image.

Parameter Values — Zero or one.

0 = Off: **1** = On

B&W NEG

Reverses all black and white values in the image. If applied to a color image, reverses all black and white values but does not change any color values in the image.

Parameter Values — Zero or one.

0 = Off: **1** = On

TIP

To create a black and white negative effect, also turn on the B&W effect.

POSTERIZE

Reduces picture's continuous tones to fewer levels. Creates a "painted" look.

Parameter Values — Zero through nine. Zero turns off the effect.

High values produce an extreme paint effect: low values create a subtle effect.

FLIP HORIZONTAL ↔

Flips picture left-to-right, creating a mirror image.

Parameter Values — Zero or one.

0 = Off: **1** = On

MOSAIC

Divides picture into tiles.

Parameter Values — Zero through nine. Zero turns off the effect.

Low values create numerous, small tiles. High values create fewer, larger tiles. Highest values might make image difficult to recognize.

COLOR CORRECT

Adjusts overall color values throughout the entire image.

You can set Color Correction values separately for each channel.

Parameter Values — Zero or one.

0 = Off: **1** = On

> 🛑 **CAUTION**
>
> **Apply color correction BEFORE going live or rolling tape. Because of the way the MX-4 DV implements color correction, the program output might be affected temporarily.**

To use Color Correct:

1   Press **COLOR CORRECT** to display the Input Effects menu, or press **EFFECTS** then use the **ARROW** keys to highlight the Color Correct icon.

2   Press the **NEXT** button that corresponds to the source you want to correct. For example, to apply color correction to channel C, press **NEXT/C**.

3   Turn on the Color Correct option. That is, either press **1** on the keyboard, or press **COLOR CORRECT** so the parameter value equals 1.

    The MX-4 DV replaces the Input Effects menu with a preview of the color corrected image.

4   Use the **JOYSTICK** to adjust the RGB (**R**ed, **G**reen, and **B**lue) values in the image.

5   Use the **T-BAR** to adjust the luminance of the image. You can do fine-grained adjustment with the arrow keys (and shift arrow keys), just like in the Learn color mode.

6   When the image looks the way you want, press **OK** to exit from Input Effects mode.

COLOR NEG

Inverts all colors in the image.

Parameter Values — Zero or one.

0 = Off: **1** = On

VIDEO ADJUSTMENT

Allows you to access the Brightness, Color Saturation, Contrast, and Hue adjustment menu. Use the **ARROW** keys to select this option, then press **OK**. The MX-4 DV then guides you to the video adjustment menu. Refer to "Using Input Effects" on page 62 for complete details.

Parameter Values — Zero or one.

0 = Off: **1** = +**OK** activates video adjustment menu.

CHROMAKEY
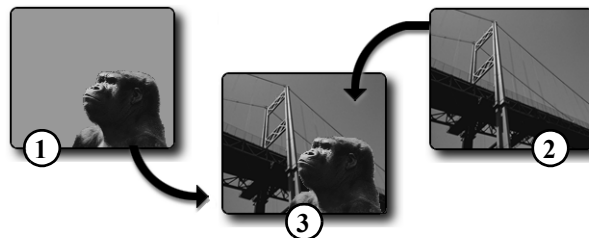
Chromakey replaces all occurrences of a color in an image with a different image. In this example, (1) the block of color in the first image (the area behind Kong's head) gets replaced with the image of the Golden Gate Bridge (2). The resulting image (3) is Kong superimposed over the bridge. Refer to Chapter 10, *Chromakey*, for complete details.

FLIP VERTICAL ↕

Flips picture top-to-bottom.

Parameter Values — Zero or one.

0 = Off: **1** = On

STROBE

Slows down the picture's video frame rate. Motion appears halting, or jerky — like that produced by a strobe light. The strobe effect stays on during a transition.

Parameter Values — Zero through nine. Zero turns off the effect.

Higher values increase the effect. Setting 1, for example, produces the look of film: setting 2 makes video look like an old movie.

NOTES

FUNCTIONS

This chapter describes the Function buttons, that give you access to the MX-4 DV's built-in functions. The function button group contains eight buttons, but gives you access to more than eight functions.

DEMO/DISPLAY

SETUP/FTP

ROUTE

LEARN

COMPOSE

PIPs

AUDIO MIX

FREEZE
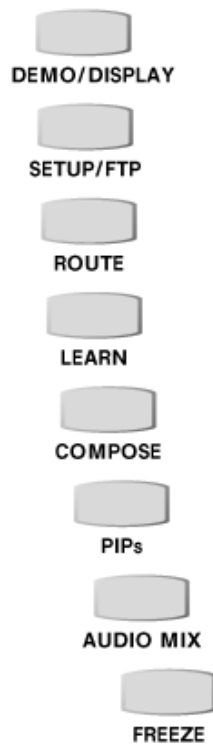
DEMO

Press **SHIFT+DEMO/DISPLAY** to run a demonstration of several MX-4 DV transitions and other effects. Demo works in conjunction with the CURRENT and NEXT sources. (If you have one source selected as CURRENT and NEXT, the demo works with that source only.) The demo shows many of the effects you can produce with the MX-4 DV.

The demo runs automatically and, upon reaching the end, starts over from the beginning.

To run the demo:

1   Select the CURRENT and NEXT sources to use for input to the demo.

   To use a single source (such as channel A), press **CUT/A** and **NEXT/A**. To use two different sources (such as channels A and B), press **CUT/A** to make it the CURRENT source, then press **NEXT/B** to make it the NEXT source.

2   Press **SHIFT+DEMO/DISPLAY** to start the demo running.

3   To exit from the demo, press any key.

🌀 TIP

If you see a transition you like while the demo runs, immediately press any key to stop the Demo. When the Preview screen returns, the last transition run is highlighted in the Transitions Menu. Make a note of the transition number, then add it to your custom User Transitions Menu. Refer to "Changing User Transitions Menu" on page 52.

Running a Locked Demo

You can run the demo in *locked* mode, which prevents it being stopped by pressing any key on the keyboard. This might be useful for running the demo in a kiosk, a trade show, or anyplace where someone might interrupt it.

To run the demo in Locked mode:

1   Select the CURRENT and NEXT sources to use for input to the demo.

   To use a single source (such as channel A), press **CUT/A** and **NEXT/A**. To use two different sources (such as channels A and B), press **CUT/A** to make it the CURRENT source, then press **NEXT/B** to make it the NEXT source.

2   Press **LEARN+DEMO/DISPLAY** to start the demo.

3   To exit from the locked demo, press **LEARN+DEMO/DISPLAY** again.

DISPLAY

To control what appears on the Preview monitor, use the **DISPLAY** function. Press **DEMO/DISPLAY** to cycle through the different display configurations. Refer to samples of these configurations on the next page. The illustrations show the key combination you can use to directly access any display configuration.

STANDARD – Provides most extensive display. Shows preview images of all active input sources and a menu of up to 30 different transitions from which you can choose.

TWO CHANNEL – Displays preview images for the CURRENT and NEXT sources. Preview images increase in size, but the Transitions Menu shows only 20 transitions.

FULL – Divides preview screen into four sections. Each section shows a preview image of the currently active input sources. The Transitions Menu is not available.

NEXT – Displays only a full-screen preview image of the NEXT source.

CURRENT – Displays only a full-screen preview image of the CURRENT source.

DISPLAY CONFIGURATIONS

Standard – SHIFT+1
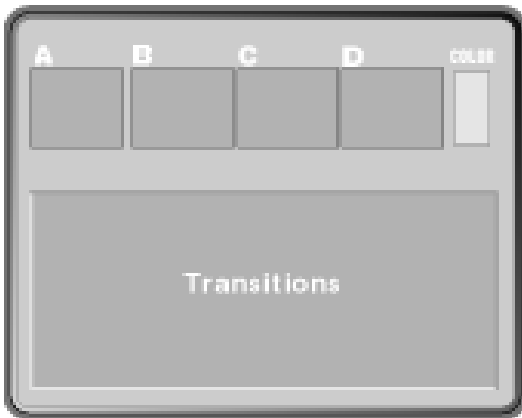
Two Channel – SHIFT+2
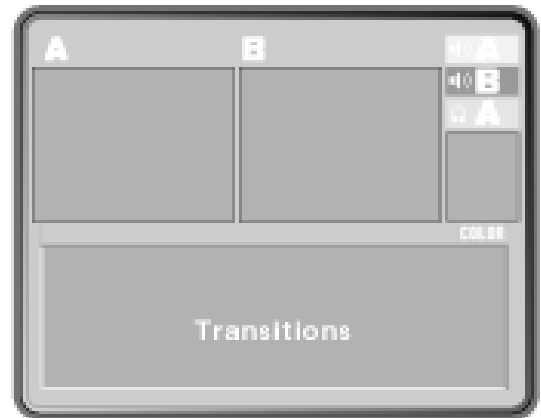
Full – SHIFT+3
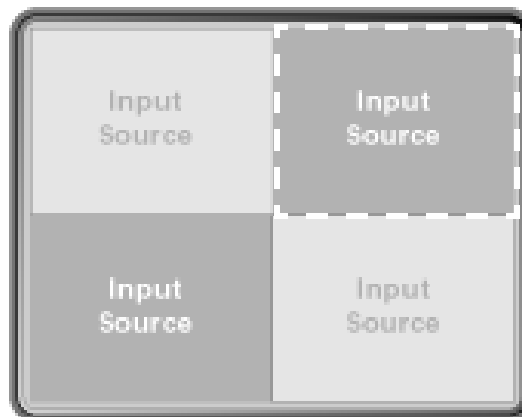
Flashing white border indicates CURRENT source, unless that source is the COLOR channel.
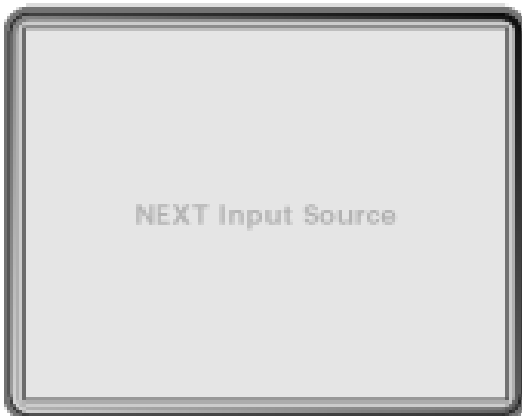
Next – SHIFT+4
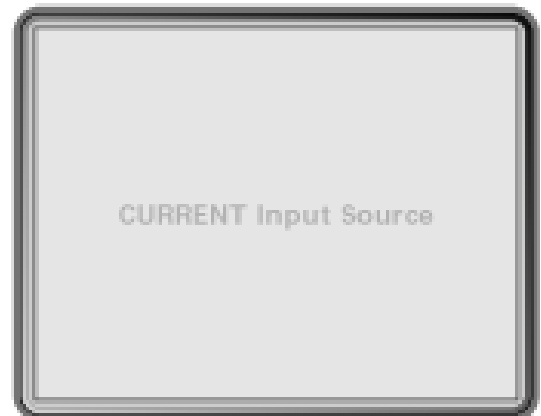
Current – SHIFT+5

*For all examples on this page, assume source A is CURRENT and source B is NEXT. Input sources C and D show up only when using **Standard** or **Full** options.*

*Use the shortcut keys or press **DISPLAY** to cycle through the display options.*

SETUP

The Setup functions control various aspects of the way the MX-4 DV operates, including Force Field Freeze, GPI Out Mode, Comb Filter, Dual Monitor Mode and 7.5 IRE Pedestal.

To access the Setup functions, press **SETUP**.

Force Field Freeze

7.5 IRE Pedestal

GPI Out Mode   Audio Mode

Dual Monitor Mode

Comb Filter
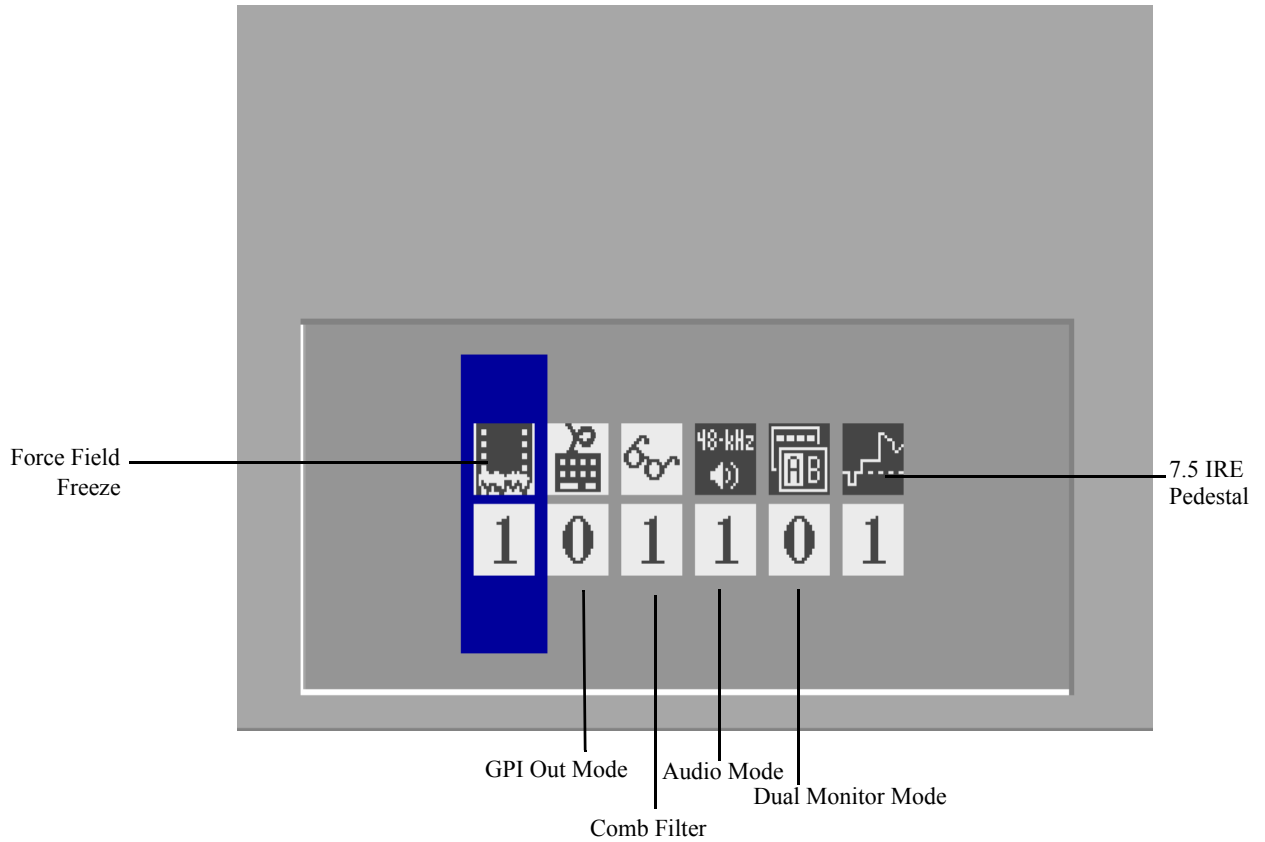
Table 8: Setup Menu Navigation Keys

TO DO THIS FUNCTION:	ENTER	NOTES
Select a menu option	**LEFT** or **RIGHT ARROW**	Wraps through all options
Enter specific option value	**NUMBER** keys	If value entered is not valid, the MX-4 DV sets to the nearest valid value.
Restore setup values to factory defaults.	**SHIFT+0**	
Exit from Setup menu	**OK**	

Force Field Freeze

The Force Field Freeze option lets you specify whether you want the MX-4 DV to perform a frame or field freeze. This option works in conjunction with the Freeze feature (refer to "Freeze" on page 79).

Frame Freeze produces best quality, but it might produce a *jittering* effect when trying to freeze objects in motion. In such cases, use a Field Freeze.

> **Field Freeze** – The MX-4 DV freezes only *every other line* of the image. This produces a fast freeze, but image quality degrades somewhat. To use Field Freeze, set the Force Field Freeze option to 1.

> **Frame Freeze** – The MX-4 DV freezes *every line* in the image. The freeze takes slightly longer, but the image quality matches the original because it uses all of the video signal. To use Frame Freeze, set the Force Field Freeze option to 0 (zero).

GPI Out Mode

This setting determines whether the MX-4 DV provides a GPI **output** to an external device, such as a character generator, thereby allowing you to *trigger* an external event based on an action from the MX-4 DV. Set the value to **0** (zero) to use the MX-4 DV with an edit controller. Set the value to **1** to enable GPI output to trigger a character generator, such as the Videonics TitleMaker.

> ⚠️ **CAUTION**
>
> **The MX-4 DV also accepts values 2 through 4 for this option. However, using any of these values might cause your equipment to malfunction and should not be used.**

Refer to "Using a GPI Device" beginning on page 120 for relevant information.

Comb Filter

This option can be used in some cases to affect the quality of the video coming from an input source. Normally, you should leave this set at the default – 1 or On. Change it only if asked to do so by a FOCUS Enhancements Customer Support Representative.

Audio Mode

This option allows you to choose between 32-kHz and 48-kHz audio on DV OUT. Set the value to 0 (zero) for 32-kHz audio, or 1 for 48-kHz audio.

Dual Monitor Mode

This lets you specify whether you want the MX-4 DV to run the selected transition on both the preview and program monitor at the same time with a setting at **0**. As an alternative, you can keep the preview screen constant while the transition takes place on the program monitor only with the setting at 1.

7.5 IRE Pedestal

NTSC Video equipment commonly uses one of two black level settings:

- **7.5 IRE** – The traditional black, which is the MX-4 DV default setting.
- **0 IRE** – A darker black level used in Japan.

To use the darker black (0 IRE) for the MX-4 DV background and border colors, set Pedestal to **0** (zero).

If you are working with equipment that requires 7.5 IRE, set Pedestal to **1**.

> **ℹ NOTE** ─────────────────────────────────────
>
> This option is not available on PAL versions of the MX-4 DV.

FTP

The FTP function lets you network your MX-4 DV to a PC using the Ethernet connector on the back of you unit. You can copy background, foreground and still frame jpeg images to or from your unit. Refer to "Ethernet Connection" in Chapter 13 for complete information.

ROUTE

The Route function has the following primary purposes:

- Configure the MX-4 DV to match your equipment.
- Re-direct signals coming from an input device to different or multiple MX-4 DV channels.

Configuring the MX-4 DV

The MX-4 DV ships from the factory with the following default options:

- Source Input 1's video and stereo audio are assigned to Channel A, with the video signal routed through the DV IN 1 connector.
- Source Input 2's video and stereo audio are assigned to Channel B, with the video signal routed through the DV IN 2 connector.
- Source Input 3's video and stereo audio are assigned to Channel C, with the video signal routed through the Y/C IN 3 connector.
- Source Input 4's video and stereo audio are assigned to Channel D with the video signal routed through the Y/C IN 4 connector.
- Color Source defaults to MUTE.
- BKGD MUSIC Source defaults to MUTE.
- BACKGROUND and FOREGROUND graphics default to OFF.

Unless you tell the MX-4 DV otherwise, it assumes your sources are connected exactly as described above.

Default Settings for Route Functions   If your set up does not match the default options, you need to change the Route settings. For example, assume you have an Y/C VCR attached to the input jacks marked 3 (IN3), and a Composite VCR attached to the input jacks marked 2 (IN2). You don't need to change anything for the first input because it matches the default setting. However, because the second source is a Composite device (rather than DV) you need to notify the MX-4 DV of this fact.

Changing the Routing

To change the routing,

1   Press **ROUTE** to display the Route menu.

The MX-4 DV has four internal channels: A, B, C and D. The route menu lets you select which of the twelve inputs are connected to each of the four channels.

Audio sources can be routed to the same four channels (A, B, C and D) and in addition, can be routed to the color channel (Color) or the background audio channel (BKGD). Refer to Chapter 12, *Working with Audio*, for more information.

2   Select the channel (A,B,C or D) you want to change by pressing **NEXT/A**, **NEXT/B**, **NEXT/C**, **NEXT/D**, **NEXT/BACKGROUND**, or **SHIFT+NEXT/BACKGROUND** (for Background Audio). Once you select the channel, it is highlighted.

3   Select the video source you want to display for this channel. Use the **UP ARROW/DOWN ARROW** keys to move to the Video row, then use the **LEFT ARROW/RIGHT ARROW** keys to select a video source.

a   The first choices in each Video Input selection (IN1-4) are composite (V) and Y/C (S) sources.

b   The next choice in each video input section (IN1-4) are DV sources.

c   The remaining choice to the right consists of a graphics/gradients input selection. Once you select this feature and press **OK**, a sub menu appears providing the option to select graphics/gradients or a solid color as an input. Refer to "Sub-Route Menus" on page 77 for more information.
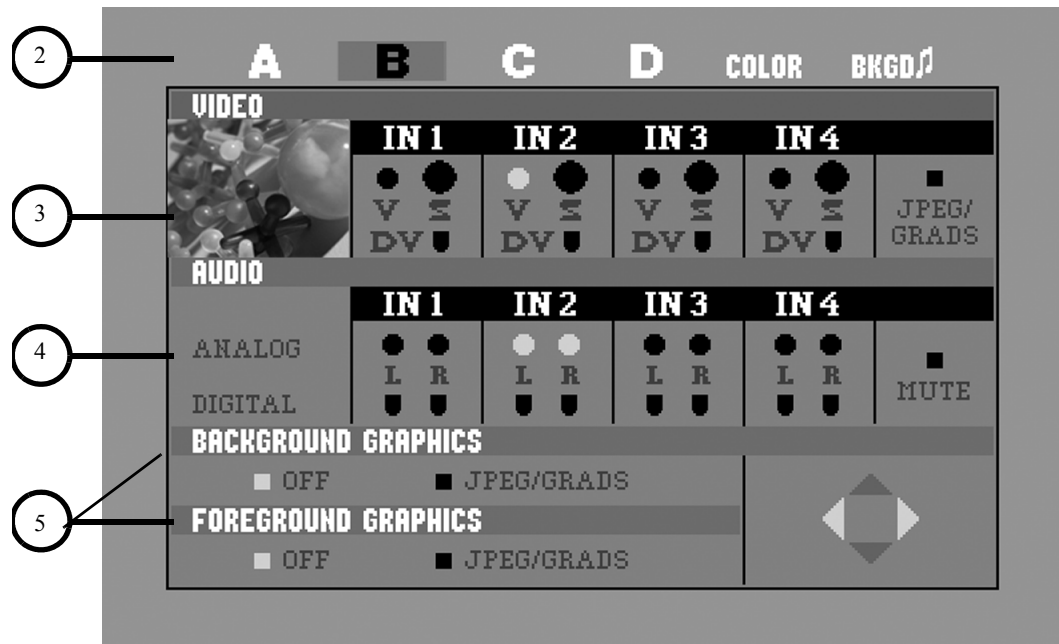
4   Select the Audio source to use with your selected channel. Use the **DOWN ARROW** key to highlight the Audio row, then use the **LEFT ARROW/RIGHT ARROW** keys to select an audio source.

    a   Audio can be a stereo pair of inputs from a DV source IN1-4 or from analog inputs IN1-4

    b   Audio is available to output on DV audio channels 1 and 2 or on analog outputs L1 and R1, if you select 2-channel 48kHz audio output in the Setup Menu.

    c   IN1, IN2, IN3 and IN4 can be either mono or stereo sources: you can select the left channel, the right channel, or both.

    d   DV sources can have two or four channels of audio inputs. If you use 4-channel sources and select 4-channel output in the Setup Menu, you can either select channel 1 and 2 or 3 and 4, but not both at the same time. Note that while using 4-channel audio output DV will only run in 32kHz and not allow mixing and matching. If you select 2-channel audio output in the Setup Menu, it will run at 48kHz on channels 1 and 2.

    e   Select **MUTE** if you do not want audio routed to this channel.

    f   Press **SHIFT+NEXT/BACKGROUND** to route to the Background Audio channel.

    g   Press **OK** or **ROUTE** to exit the Route Menu.

5   You can select a foreground and/or a background graphic. Once you select this feature, press **OK** and the MX-4 DV will guide you into either the foreground or background graphics menu to select the imported graphic of your choice. When you make the selection, press **ROUTE** to return to the Route menu. Note that you can apply four layer video effects, that can include a background, foreground and two jpeg inputs all at the same time.

Example: Changing the Routing

In this example, you will change the Routing for Channel C, make video come from DV IN1, and make Audio come from L1 and R1 or DV IN1 using 2-channel input a 48kHz.

1   Press **ROUTE** to display the Route menu.

2 Select the channel by pressing **NEXT/C**. Verify that channel C is highlighted.

3 Select the Video. Use the **UP ARROW/DOWN ARROW** keys to move the red highlight bar to the Video row, then use the **LEFT ARROW/RIGHT ARROW** keys to select DV IN1.

4 Select the Audio channel. Since you are in a 2-channel input, use the **UP ARROW/DOWN ARROW** keys to move to the Audio row representing the Digital section, then use the **LEFT ARROW/RIGHT ARROW** keys to select L1 and R1 within DV IN 1.

Routing Audio Through Color or Background Channels

Don't forget that you can route audio through the Color and Background Channels. These are useful for fading to colors while maintaining the same audio source or mixing words with a music background.

To route audio through the Color or Background Channels:

1 Press **NEXT/BACKGROUND** or **SHIFT+NEXT/BACKGROUND** to select the Color or Background channel. Refer to "Using the Audio Mixer" on page 111.

2 Use the **LEFT ARROW/RIGHT ARROW** keys to select the audio of your choice.

Sub-Route Menus

You can select Sub-Route menus for the following:

- Input graphics
- Foreground graphics
- Background graphics

Once you highlight the selection on the Route Menu, press **OK** to continue into the selected sub-menu.

Input Graphics and Background Graphics Menu

Once you have chosen either a graphic as an input or apply a background graphic from the main router menu, you will be directed to the menu referenced below. The menu provides eight gradients and a possible 50 background jpegs to add to your unit.

Use the **ARROW** keys to select a graphic. You can change the gradient colors by using the **BG COLOR** button. To create a custom gradient colors, press **LEARN+BG COLOR**, and then use the joystick and **T-BAR** to create a new color. When you're done creating a custom color, press **OK**.

Background Graphics Menu
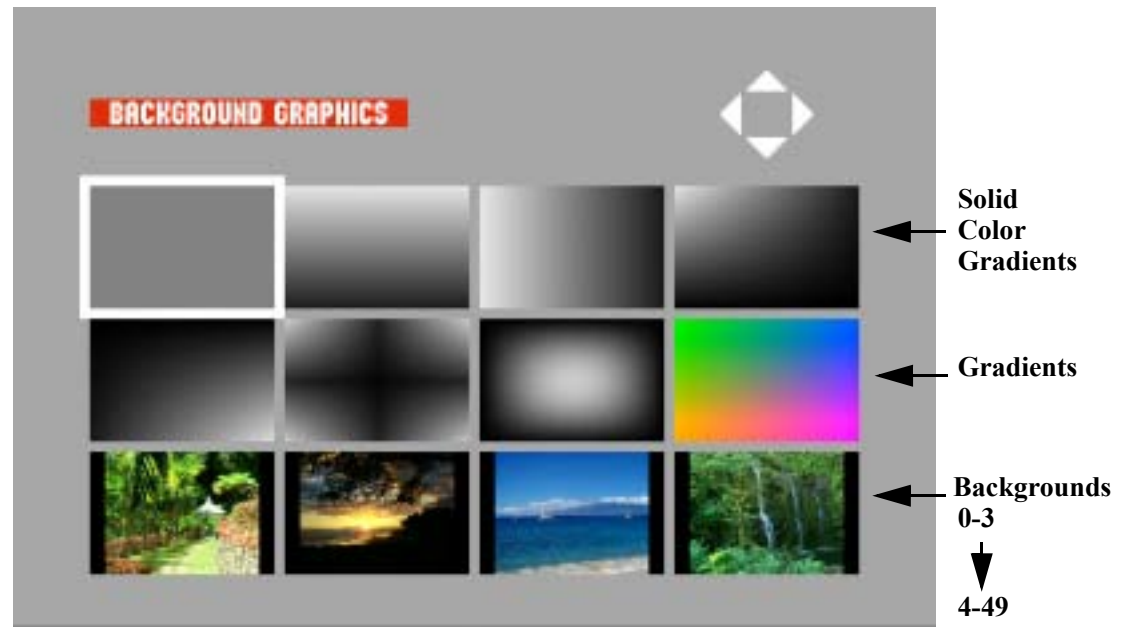
Importing Graphics into the Foreground or Background Menus

In order to import a jpeg into the Foreground or Background menu, you must first assign a proper file name. This name must include the specified menu (background or foregrounds) and placement within the selected menu (0-49 foregrounds, 0-49 backgrounds).

Example: *Back_08.jpeg*

Once you complete your file name configuration, you can then import the jpeg files using the Ethernet port on the back of the unit and by using the standard FTP software. Refer to "Transferring Files TO or FROM the MX-4 DV" on page 130, for complete details.

The MX-4 DV comes with the following installed 12 inch Design background and foreground jpegs:

Background_00.jpeg through *Background_49.jpeg*
Foreground_00.jpeg through *Foreground_49.jpeg*

Importing jpegs for background, input or foreground use will automatically replace what currently exists on your MX-4 DV. A factory reset will not restore the original 12 inch Design jpegs that are included on the MX-4 DV. Refer to the included CD or use the FOCUS Enhancements website to re-import the original jpegs if desired.

Foreground Graphics Menu   Once you have selected "foreground graphics" from the main router menu, you, are directed to the menu below. It allows you to select various jpeg images. They can be imported and stored using the Ethernet port located on the back of the MX-4 DV.

To make a selection from the Foreground Menu, use the following steps.

1   Use the **ARROW** keys to select a graphic.

2   Once you have selected a graphic, press **ROUTE** to return to the Router menu, or **OK** to return to the Preview screen.

3   Use the joystick to position the graphic on the program side before presenting it as a live feed.

4   Use the **T-BAR** to adjust (on the program side) how transparent you would like the logo before presenting it as a live feed. You can also use the number keypad to adjust the transparency of the foreground log.

    The foreground is now ready to be included in a live application.

Foreground Graphics Menu

Correspondi... Foreground Slots

Foregrounds 0-3

4-7

8-11

12-49
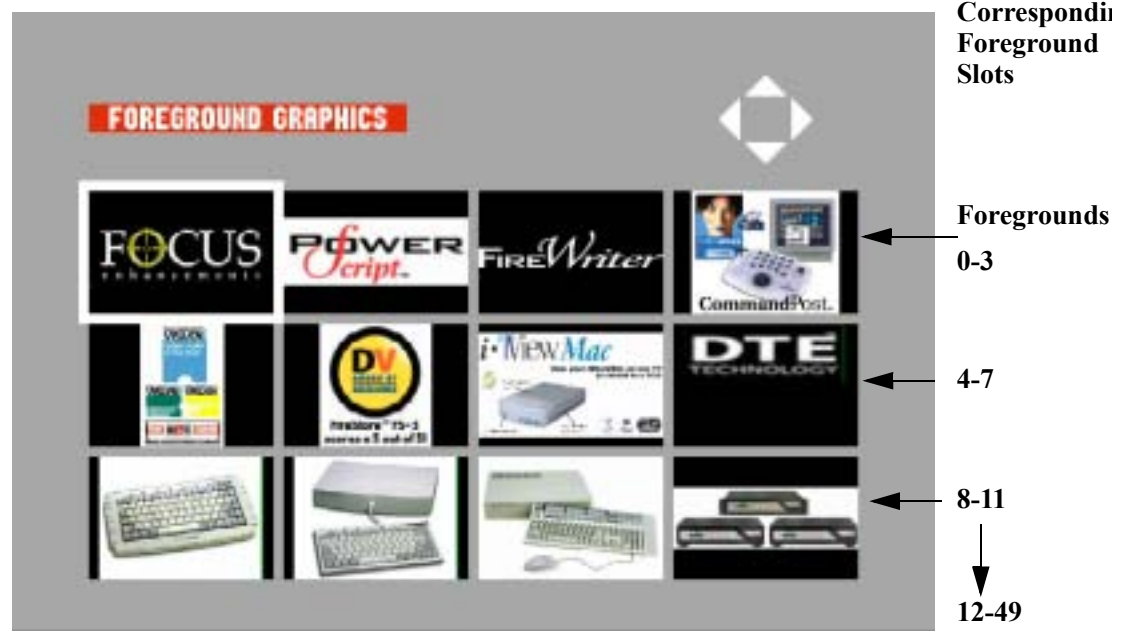
LEARN

The Learn feature consists of one or more *Learned Environments*. Within each Learned Environment you can create a *Learned Script*.

In a Learned Script you *teach* the MX-4 DV about a series of transitions and edits you want to include in a production. This is similar to using an **E**dit **D**ecision **L**ist (EDL), though not as flexible or powerful.

Once you activate the Learn feature, the MX-4 DV *remembers* each step you go through in preparing a production — including all transitions, input effects, and other operations. You can play back this *Learned Script* to automatically perform all of the steps and functions it contains.

Refer to Chapter 11, *Learn Mode*, for complete information.

COMPOSE

Use Compose to create screen images made up of several different graphic elements. For example, a composed screen might show two still images (polar bears and Kong) placed atop solid colored rectangles and a solid colored background. With a character generator (such as the Videonics TitleMaker), you can also add text elements to composed screens. Refer to Chapter 9, *Compose*.

PIPs

PIPs (Picture-In-Picture) let you combine images from separate sources and place them on the screen at the same time in separate windows (or, tiles). You have many options for arranging the PIP windows on the screen. Refer to Chapter 8, *PIPs*.

AUDIO MIX

Use Audio Mix to adjust audio levels for any channel. Refer to Chapter 12, *Working with Audio*.

FREEZE

The Freeze effect immediately freezes the selected video source.

This section describes the types of freeze effects you can produce with MX-4 DV and how to use Freeze with transitions.

You can also use the Freeze effect with the MX-4 DV PIP and Compose features. Refer to Chapter 8, *PIPs*, and Chapter 9, *Compose*, for further information.

Field and Frame Freezes

You can freeze either a video field, or a full frame.

Field Freeze – Captures every other horizontal line of the video. This is ideal for capturing anything in motion.

Frame Freeze – Captures all horizontal lines, thereby producing a higher resolution (better quality) image. Use Frame Freeze when working with still images, such as photographs. Using Frame Freeze with images in motion normally produces *jitter* in the movie.

The MX-4 DV captures using Frame Freeze, by default. Refer to "Force Field Freeze" on page 72 to learn how to change the default setting.

Major Freeze Functions

The MX-4 DV provides three major freeze functions: Freeze **Current**, Freeze **Next**, and Freeze **During** (Transitions).

Freeze Current Freezes the image on the Program Output device.

- To freeze the video on the current source, press **FREEZE**.

- To *un*freeze the video on the current source, press **FREEZE** again.

Freeze Next Freezes the video on the Next source. This is useful for freezing an image, then transitioning to it.

- To freeze the video on the Next source, enter **SHIFT+FREEZE**.

- To unfreeze the video on the Next source, enter **SHIFT+FREEZE**, again.

Freeze During (Transition) Stops the current transition and freezes both the Current and Next video sources.

- Freeze during transition works the same as Freeze Current and Freeze Next. **FREEZE** toggles the freeze state of the current source and **SHIFT+FREEZE** toggles the freeze state of the **NEXT** source.

- **FREEZE** no longer pauses or unpauses the transition.

Freeze Examples

This section discusses some common uses for the Freeze function. As you use the MX-4 DV over time, you'll probably create many others ways to use this function.

Single Source (A/A) Editing When working with a single source, use the Freeze function to transition to or from the second image.

To use Freeze with Single Source Editing:

1 Route the same video source to Channel A and Channel B.

2 Use the **CUT/A** and **NEXT/B** buttons to specify Source A as the Current Source and Source B as the Next Source.

3 Enter **SHIFT+4** to select Preview NEXT mode on the Preview Monitor.

4 Press **FREEZE** to freeze the Current source.

   The MX-4 DV freezes the Current source on the Program monitor, and the Next source (on the Preview monitor) continues moving even though there is only one source (routed to two channels).

5 Enter **1, OK, PLAY** to run a simple dissolve transition. The frozen image dissolves to moving video.

6 Press **SHIFT+FREEZE** to release the freeze on the Next source.

   To freeze and dissolve back and forth, repeat steps 3 through 5.

   The following steps explain how to transition from moving video to a still image.

7 Enter **SHIFT+FREEZE** to create a still frame on the Next source.

8 Enter **1, OK, PLAY** to dissolve from the Current moving video to the Next still image.

9 Press **FREEZE** to release the freeze on the Current source.

Creating Still   You can use the Freeze function to transition between a series of still images to create a "still mon-
Montages   tage." You can use from one to four sources.

To create a still montage:

1   Route a video source to Channel A. Remember, you can use up to as many as four sources for
     this procedure.

     This example starts from a black screen, then transitions to a still image.

2   Enter **BG COLOR+0** (zero) to set the background color to black.

3   Press **CUT/BACKGROUND** to set the Color Channel as the Current source. You now have a
     black screen on the Program monitor.

4   Press **NEXT/A** to set Channel A as the Next source.

5   Enter **SHIFT+4** to set the Preview monitor to Preview Next mode.

     You're now ready to create and transition to the first still image.

6   Enter **SHIFT+FREEZE** to create a frozen image on the Next channel.

7   Enter **1, OK, PLAY** to dissolve from black to the first frozen image.

     The NEXT and CURRENT sources swap positions. You're now ready to select the second still
     image.

8   Press any **NEXT** button to select a new source to freeze.

9   Enter **SHIFT+FREEZE** to freeze the NEXT image.

10   Enter **1, OK, PLAY** to dissolve to the NEXT image.

To transition to other still images, repeat steps 8 through 10.

NOTES

PIPs

With the MX-4 DV you can easily produce single and multiple Picture-in-Picture displays.

Single PIP   **Multi-PIP**

PIP (**P**icture-**I**n-**P**icture) provides a way to combine images on the same screen. For example, one image appears inside a small rectangle, and the other image fills the remainder of the screen as shown by **Single PIP,** above.

You can freeze the background or foreground, or make either one a solid color.

You can create **Single PIP** configurations where two images appear on the screen at the same time. You can also create **Multi-PIP** configurations where up to four images appear on the screen at the same time. Single PIP and Multi-PIP work differently.

PIP images consist of a *tile* (the video image) and a *mask* (the window or shape through which the tile shows).

SINGLE PIP

In a single PIP configuration, one tile fills the background while another tile and its mask *float* atop the background. The CURRENT source always serves as the background tile; the NEXT source always serves as the PIP image.

Foreground Tile and Mask
…from NEXT Source

Background Tile
…from CURRENT Source
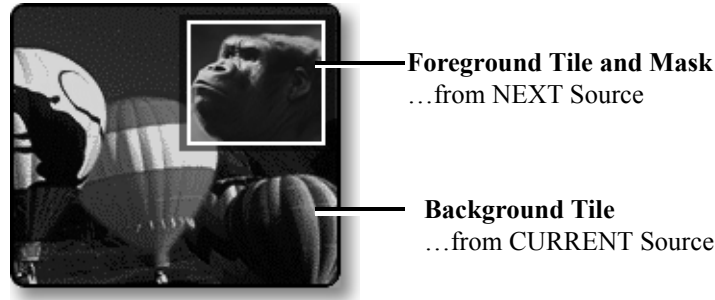
Background Tile

The background tile always fills the entire screen. You can apply Input Effects (Strobe, Freeze, and so forth) to the background tile, or make the tile a solid color. You cannot otherwise change the background tile in any way.

Foreground Tile

You can manipulate the foreground tile and mask in different ways, such as:

•   Position the tile anywhere on screen.

•   Change the size and shape of the tile and its mask.

•   Create a border around the tile.

•   Reposition, resize, and otherwise change the mask without changing its corresponding tile.

To create and apply a single PIP:

1   Assume the background image originates on input source A. Press **CUT/A** to make source A the CURRENT source. It serves as the background tile.

   If you want, instead, to make the background a solid color, press **CUT/BACKGROUND**. Refer to "Using Color Backgrounds" on page 42 to learn how to select colors.

2   Assume the image of the gorilla originates on input C. Press **NEXT/C** to make source C the NEXT source. It serves as the foreground tile.

3   Press **PIPS** to enter PIP mode. The Preview screen shows the background video with the foreground video inset in a small tile.

4   Press **NEXT/A**, **NEXT/B**, **NEXT/C**, **NEXT/D**, or **NEXT/BACKGROUND** to change the image in the PIP window.

5   Press **PLAY** to display the PIP on the Output.

6   To exit PIP mode, press **PIPS**.

Manipulating the Foreground Tile

This section explains how to change the position, size, shape, and so forth of the foreground tile. In each case, do the steps *after* pressing **PIPS**, as described in the preceding steps. You can do any of these steps while the PIP plays on the Output.

Table 9: Manipulating PIPs Tiles

TO CHANGE TILE…	USE OR PRESS…	NOTES…
Position		
	JOYSTICK	Moves the tile and its mask around the screen.
	OK+JOYSTICK	Moves the tile around the screen.
Size (*Resizing the tile normally distorts the image it contains.***)**		
	T-BAR	Resizes the foreground tile and its mask. Use the **T-BAR** to manually zoom the image.
	OK+T-BAR	Resizes the foreground tile.
	UP ARROW	Increases the height of the foreground tile and its mask.
	DOWN ARROW	Decreases the height of the foreground tile and its mask.
	RIGHT ARROW	Increase the width of the foreground tile and its mask.
	LEFT ARROW	Decrease the width of the foreground tile and its mask.
	SHIFT+FLIP ▲	Snaps the PIP tile and its mask to the normal aspect ratio base on the current horizontal dimensions.
	SHIFT+FLIP ▼	Snaps the PIP tile and its mask to the normal aspect ratio base on the current vertical dimensions.
	SHIFT+0 (zero)	Restores the PIP tile to the default size, shape, and position.
Shape		
	SHAPES	Cycles through available shapes for foreground tile.
	SHIFT+SHAPES	Cycles backward through shapes.
	n	Applies a specific shape to the tile, where *n* corresponds to the numbers shown in the shapes following this table.

You can apply the following shapes to PIP tiles. To select a shape, press the numeric key (**0** through **9**) that corresponds to the shape you want, as indicated below.
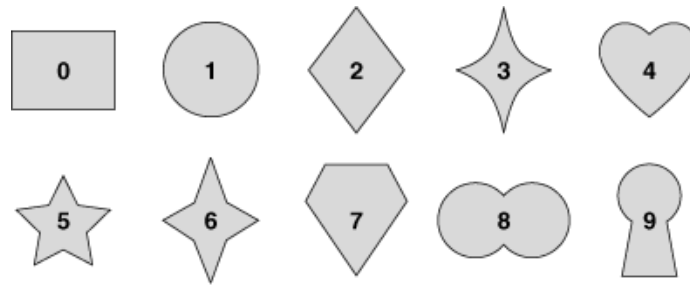
Additional shapes can be selected for PIP mode using the **SHAPES** button.

Manipulating the Mask The mask changes shape, size, and position when you change the corresponding attribute of the foreground tile. You can, however, manipulate the mask independently, as discussed in this section.

Table 10: Manipulating PIPs Mask

TO CHANGE MASK…	USE OR PRESS…	NOTES…
Position		
	SHIFT+JOYSTICK	Change mask position.
Style (*Press keys repeatedly to cycle through available colors and styles.***)**		
	BORDER COLOR	Change mask border color.
	BORDER STYLE	Change mask border style.
Size		
	SHIFT+T-BAR	Change mask size.
	SHIFT+UP ARROW	Increase vertical size of mask.
	SHIFT+DOWN ARROW	Decrease vertical size of mask.
	SHIFT+RIGHT ARROW	Increase horizontal size of mask.
	SHIFT+LEFT ARROW	Decrease horizontal size of mask.

Using Other Effects with Single PIPs

Input Effects You can apply any of the input effects (refer to Chapter 6, *Input Effects*) to the background and foreground tiles. Apply the input effect(s) you want prior to entering PIP mode.

The Freeze Effect You can apply the Freeze effect (refer to "Freeze" on page 79) to the background and/or foreground tile.

Press **FREEZE** while in PIPs mode to freeze the background. Press **FREEZE** again to release the freeze effect.

Press **SHIFT+FREEZE** while in PIPs mode to freeze the foreground tile. Press **SHIFT+FREEZE** again to release the freeze effect.

MULTI-PIP
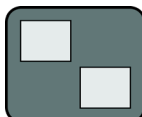
In Multi-PIP, as many as 4 separate images can share the screen at the same time. Each image appears inside a separate *tile*.

You can use any of the four input sources to provide the images that appear in the tiles.

You can choose from 9 different multi-PIP configurations by pressing the number keys shown in the following table.

Table 11: Multi-PIP Screen Configurations

NO.	CONFIGURATION	NO.	CONFIGURATION	NO.	CONFIGURATION
1		4		7	
2		5		8	
3		6		9	

The following procedure explains when to specify which configuration you want to use.

To create a multi-PIP image such as the one shown above:

1   Assume the image of Kong originates on input source A. Press **CUT/A** to make source A the CURRENT source.

    If you want, instead, to make the background a solid color, press **CUT/BACKGROUND**. Refer to "Using Color Backgrounds" on page 42 to learn how to select colors.

2   Assume the graphic of the word "Kong" originates on input C. Press **NEXT/C** to make source C the NEXT source.

3   Press **SHIFT+PIPS** to enter Multi-PIP mode. The Preview screen defaults to show configuration 1 (two horizontal tiles). One of the tiles has a flashing border to indicate it is the current tile. One tile shows the primary input – Kong's head.

4   If this is the Multi-PIP configuration you want to use, move on to the next step: otherwise…

   a   Press the number on the keyboard that corresponds to the PIP configuration you want to use. (Refer to Table 11, "Multi-PIP Screen Configurations," on page 87, at the beginning of this section.) MX-4 DV displays the configuration on the Preview screen.

5   Use the **ARROW** keys to move the flashing border to a tile where you want to display the secondary input source: or, press **SHIFT+ARROW KEY** to move to the beginning or end of a row or column.

6   Press **NEXT/C**. Channel C, in this example, carries the video of the graphic word "Kong." That image appears in the tile you selected in the preceding step.

7   Repeat the two preceding steps for any other tile or tiles you want. You can direct any input signal to any tile by using one of the **NEXT** keys.

8   When the Preview screen looks the way you want, press **PLAY** to cut to the Multi-PIP on the output; or use the **T-BAR** to fade the Multi-PIP to the output.

9   Press **SHIFT+PIPS** to return to the Preview screen.

Using Freeze Effect with Multi-PIPs

You can apply the Freeze effect (refer to "Freeze" on page 79) to any Multi-PIP tile.

To use the Freeze effect with Multi-PIPs:

1   Use the **ARROW** keys to select a Multi-PIP tile.

2   Press **FREEZE**.

3   Press **FREEZE** again to release the effect.

COMPOSE

A composition can contain up to four moving (or still) video tiles, an unlimited amount of solid color tiles, and one background.

Compose provides a way to create screens containing picture elements, solid colors, and rectangles.

A composed screen consists of a *background* and one or more objects (called *tiles*) placed atop the background. The background fills the entire screen. Tiles can vary in size and appear anywhere on the screen.
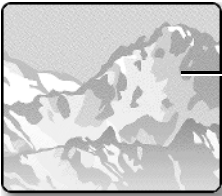
IMPORTANT INFORMATION

You cannot save composed screens. Therefore, once you set up the composed screen the way you want it, you must immediately record or display it on the output device. If you move on to other functions without recording or displaying the composed screen, it is lost and cannot be recovered.

The MX-4 DV provides a limited set of "drawing tools" in compose mode to help you create backgrounds and tiles.

BASIC COMPOSITION STEPS

This sequence shows how the composition at the beginning of this chapter was produced. More detailed descriptions of the steps follow.

1   Select the background. This example uses a still image of a mountain range. You can use imported still jpeg images, gradients, solid color backgrounds, or color bars.

2   Create a solid color tile. This rectangle serves as a background for the next element and separates it from the main background image.

3   Create the next tile, which is a moving video of two polar bears jousting.

4   Create another solid colored tile. You might eventually use this tile as a background for a text title.

5   Create one last solid color tile, but make it long and thin so that it looks like a simple, wide line.

BACKGROUNDS

The background for a composition can be any of the following:

- A moving video sequence
- A still image (that is, a frozen frame from a video sequence)
- A solid color
- A set of color bars
- A gradient
- An imported still frame jpeg image

As you'll learn later in this chapter (under "Creating a Composed Image"), you must establish the background *before* entering Compose mode.

FOREGROUND TILES

Creating Color Tiles and Lines

Color tiles can be rectangles of any size and shape.

Colored lines are simply thin rectangles. You can create horizontal and vertical lines, but not diagonal ones.

When you place a color tile on the screen, it can overlap other tiles. If the other tile is a color tile, the new tile obscures the previous one wherever they overlap. However, if the other tile is a moving video, the color tile does not cover any portion of the moving video.

Once you create a color tile you can use **BG COLOR** to change its fill color.

Creating Moving Video Tiles

A tile can contain video originating from any of the MX-4 DV input sources.

The tile can be a rectangle of any size. The MX-4 DV scales the incoming video to fit within the tile, it does not crop the image.

Creating Still Image Tiles

Still image tiles can contain a frozen image from any of the input sources.

MANIPULATING TILES

You can place foreground tiles anywhere you want on the screen. You can set their size, fill them with color or images, and set their border characteristics.

✅ TIP

Remember, once you place and define a foreground tile you cannot change it. Placing the tile occurs once you move the Compose Cursor (or, rectangle) to any other position on the screen. You'll learn about the Compose Cursor in this section.

Positioning Tiles

When you press the **COMPOSE** button to enter Compose mode, the MX-4 DV shows your choice of background on both the Preview and Output monitors. The MX-4 DV also displays a flashing rectangle at the center of the Preview screen. This flashing rectangle is called the *Compose Cursor.*

The Compose Cursor (a flashing rectangle) appears on the Preview screen when you enter Compose mode.
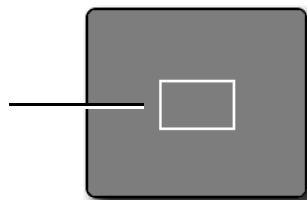
JOYSTICK positions Compose Cursor

Use the **JOYSTICK** to move the Compose cursor where you want it on the screen. You can also use the **ARROW** keys to make fine adjustments.

Sizing Tiles

You can make foreground tiles any size you want, from covering the entire screen to a thin horizontal or vertical line.

Always establish the size of the tile *before* filling it with a solid color, moving video, gradient, or jpeg image.

Use the **SHIFT** key in conjunction with one of the **ARROW** keys to adjust tile size. Enter **SHIFT+0** (zero) to restore the tile to its default size.
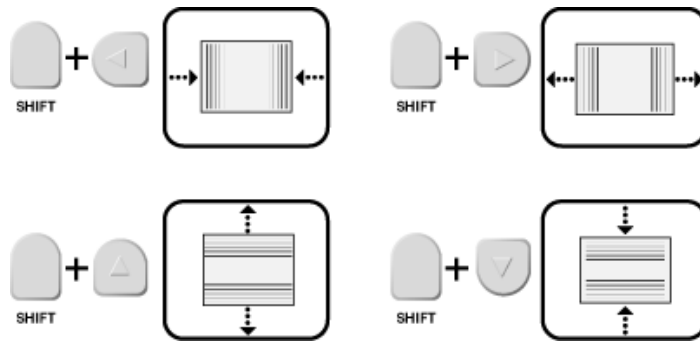
Enter **SHIFT+FLIP** ↔ to reproportion the tile based on its current width. Enter **SHIFT+FLIP** ↕ to reproportion the tile based on its current height.

COMPOSITION RULES

Observe the following rules when creating compositions.

- Select and define the image you want to use as the background *before* entering Compose mode.

- A composition can contain one background and anywhere from one to four video foreground tiles with many colors.

- When you create a foreground tile that overlaps an existing solid color rectangle or still image, the overlapping portion erases whatever it overlaps.
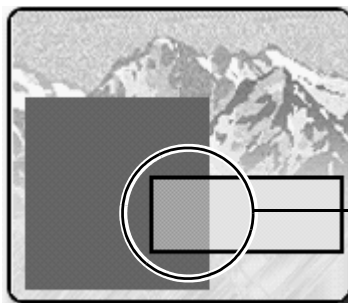
The larger tile is drawn first. When the second tile is drawn, it overlaps part of the larger one. The overlapping portion of the smaller tile erases that portion of the larger tile where the two overlap.

- Reducing the size of a still or moving video image normally introduces minor pixel artifacts, thus reducing quality.

- Once you place (or, *stamp*) a foreground tile into place, you cannot move or change it.

- To use a composed image, you must record or display it on the output. There is no other way to save the composition.

- You cannot use composed screens in conjunction with Learn mode.

CREATING A COMPOSED IMAGE

To create a composition:

1   Create or choose the background, foreground, gradient, or still frame jpeg image on the Route screen. Do this *before* entering Compose mode because the CURRENT source at the time you enter compose mode automatically becomes the background for the composition.

   a   **Solid Color Background** – Use the BG COLOR button to select the color you want. Then press CUT/BACKGROUND or use a transition to make BACKGROUND the CURRENT source.

   b   **Moving Video Sequence** – Use the appropriate CUT button to make the desired input source the CURRENT one. For example, to use a moving video sequence from source C as the background, press CUT/C.

   c   **Still Image** – Use the appropriate CUT button to make the desired input source the CURRENT one. For example, to use a frame from source B as the background, press CUT/B. When the frame you want to use as the still image appears on the Preview screen, press FREEZE to create the still image.

   d   **Color Bars** – Press SHIFT+NEXT/BACKGROUND while in Compose mode to display color bars in the background.

   e   **Input Effects** – Apply any Input Effects you want to the background source before entering Compose mode.

   f   **Gradient or Jpeg** – Use the Route menu to choose a gradient or jpeg and then route it to a source. Next press the CUT key associated with that source to make the gradient or jpeg the background.

2   Press COMPOSE to enter Compose mode.

   A full screen image of the CURRENT source (the one on the Output) replaces the Preview screen. The Compose Cursor appears on the Preview screen.

✔ TIP

To use color bars as the background, enter SHIFT+NEXT/BACKGROUND now – before creating foreground tiles.

3   Use the JOYSTICK or ARROW KEYS to position the Compose Cursor where you want it on the screen.

4   Size the Compose Cursor to the size you want for the foreground tile.

   You can do the two preceding steps in either order.

5   Press one of the NEXT buttons to fill the tile with whatever color or image you want.

   a   **Solid Color Background** – Press NEXT/BACKGROUND to fill the tile with the currently selected color.

   To specify a different color from the one currently selected, press BG COLOR until the color you want fills the tile.

   To create a custom color for the tile, press LEARN+BG COLOR, then use the JOYSTICK and T-BAR to create a new color. Press OK when the tile color is the one you want.

   b   **Moving Video Sequence** – Press the appropriate NEXT button to select source A, B, C, or D. If the dimensions of the tile and video do not match, the video appears distorted.

   c   **Frozen Image** – Fill the moving video tile with the image you want, then press FREEZE.

6   Repeat steps 3 through 5 until your composition is complete.

7   Use the **PLAY** button or **T-BAR** to send your composition to the program output.

PLAYING THE COMPOSITION

To play a composition on the output device:

•   Press **PLAY** or use the **T-BAR**.

Moving the **T-BAR** from the bottom-to-top in its slot transitions the composition to Program. Moving it from top-to-bottom dissolves it out.

Pressing **PLAY** produces a cut from the CURRENT source to the composed screen — using the **T-BAR** produces a dissolve. Pressing **PLAY** or using the **T-BAR** again lets you switch back and forth between the CURRENT source and the composed image.

To reposition the **T-BAR**, hold down **SHIFT** while moving it. Holding down the **SHIFT** button temporarily disables the **T-BAR**.

> **ⓘ** NOTE
>
> If you cut to any source or exit from Compose mode, your composed screen will be lost and cannot be recovered.

EXITING FROM COMPOSE MODE

Remember, if you do not record your composed image to the output device before exiting Compose mode, your composed image will be lost and cannot be recovered.

To exit from Compose mode, press **COMPOSE**.

CHROMAKEY

Using Chromakey you can combine two completely separate images to create a composite image that might be impossible to create any other way.

You've probably seen the chromakey effect used in television weather reports. The weather person stands in front of a "blue screen" (a solid blue background) and the weather map then *keys* onto the background from some other source.

Chromakey combines two sources to create a composite image.

① One source has a solid colored background, such as a blue screen.

② The other source can be any video image.
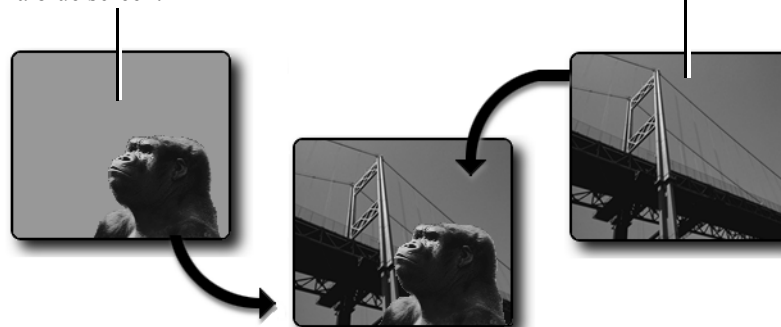
③ The chromakey effect replaces the solid colored background in the first image with the video signal from the second image. The second image replaces the background only where the designated color appears.

Chromakey requires careful preparation of the input sources to achieve the desired effect. Keep the following points in mind:

- The color used for the background must not appear elsewhere in the image. For example, if Kong's head (in the example above) contains colors close to the chromakey background, the picture of the bridge would appear in those areas. (Professionals often use a special "blue screen" paint for the backdrop when filming the image.)

- The color of the background must be evenly distributed. Glare from camera lights and shadows of the subject can alter the background color. MX-4 DV's chromakey circuitry might not be able to handle the different values, thereby spoiling the illusion.

This chapter explains how to prepare footage for use with the chromakey feature. Of course, screen images appear in grayscale in this book.

Background
Footage

Chromakey
Footage

Keyed
Footage

The **Background** footage shows traffic moving along a freeway or highway.

The **Keyed** footage, specially prepared, shows our intrepid hero flying against a solid colored background.

The **Chromakey** footage is the result of combining the background footage and keyed footage using the MX-4 DV chromakey feature.

PREPARING THE BACKGROUND FOOTAGE

Preparation of the background footage does not require anything special. It might be footage of automobile traffic taken from a bridge.

 TIP

The more unusual or dramatic the Background footage the greater the final effect of the chromakey.

PREPARING THE KEYED FOOTAGE

Preparation of the keyed footage presents a challenge. It is the most important and most difficult step, because the solid colored background is so crucial to the success of the illusion. To achieve the required background requires, in most cases, special props, lighting, and other materials.

In this example, we placed our flying hero atop a platform centered on the set.

Here's how the footage used in this example was prepared:

- Uniquely colored fabric was draped over the back, sides, and bottom of the set. The same fabric was used to wrap completely around the platform on which we posed our flying hero.

  When choosing the fabric color, it was important to try and select a fabric that did not contain any of the colors in our flying hero's wardrobe. Professional studios generally use a bright green or blue screen in place of the colored fabric.

- Key lights and fill lights were positioned so as to minimize glare and shadows during filming.

  Light bouncing off an area produces different shades of the background color. Likewise, shadows also produce varying shades. The key to successful chromakeys is to reduce as much as possible the colors in the background.

  The use of lighting filters, umbrellas, lighting stands, and similar tools can make a tremendous difference in the quality of the chromakey as well as the amount of "post production" work you must do to produce the exact illusion you want.

- Several test shots were made, then lighting was adjusted, the actor was repositioned, and so forth, until the optimum results were produced.

- Final footage was then shot.

PREPARING THE CHROMAKEY FOOTAGE

With the background footage and keyed footage recorded and available, you're ready to combine them into the chromakey effect. The following steps assume that source A is the background footage (the traffic sequence) and source C is the keyed footage (the flying hero).

To prepare the chromakey footage:

1 If necessary, turn on the MX-4 DV and all sources.

2 Start both sources (A and C) rolling.

3 Select the background footage as the CURRENT source — that is, press **CUT/A**. The image appears on the program monitor.

4 Select the keyed footage as the NEXT source — that is, press **NEXT/C**.

5 Press **CHROMAKEY** or **SHIFT+CHROMAKEY** to activate the effect. **CHROMAKEY** starts it and uses the last chromakey setting you created; **SHIFT+CHROMAKEY** starts with a new chromakey setting.

The Preview screen displays a full-screen picture of the keyed footage from source C. A cursor (a small flashing circle) appears atop the image.

Chroma Key Cursor
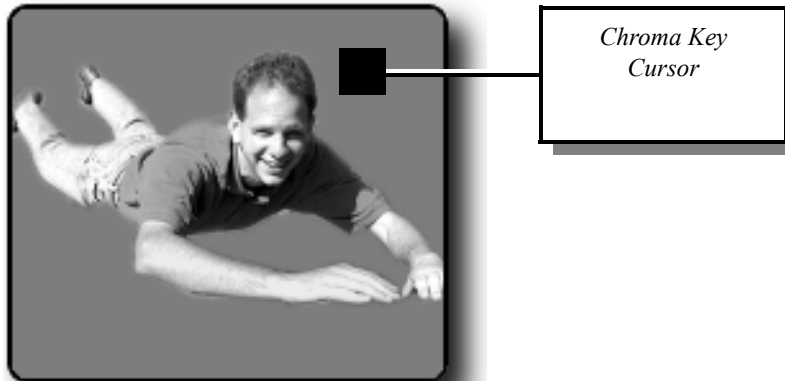
Once you activate the Chroma Key, it stays in effect until you specifically deactivate it (which you'll learn to do later in this procedure).To change the selected color or colors for the Chroma Key, press **SHIFT+CHROMAKEY**. This instructs the MX-4 DV to discard the current set of colors so you can specify different ones.

6   Use the **JOYSTICK** or **ARROW** keys to move the cursor so that it is directly over the area that contains the color to key out — that is, to specify the area in which the other video source is going to play.

7   Press **OK**. Those areas in the picture that match the color under the cursor get replaced by the background source.

     a   If you need to include other colors in the keyed-out area, repeat steps 6 and 7. You can repeat the steps as many times as necessary to key-out the entire background.

     b   To remove the last keyed color change, enter **SHIFT+0** (zero).

     c   To fine-tune the keyed color, use **SHIFT+ARROW KEY**.

If you aren't able to successfully isolate the background from the subject, you might have to re-shoot the scene using a background of a different color — or, you might just need to change the lighting to eliminate glare and shadows.

Cancelling the Selections   If you need to start over, you can cancel all of the chromakey selections made thus far by pressing **SHIFT+CHROMAKEY**, as explained above.

PERFORMING THE CHROMA KEY

When the preview screen shows the desired chroma key results:

- Press **PLAY**. The output monitor shows the chroma key image. Press **PLAY** again to cut back to the background source.

  You can also dissolve between the background footage and the chroma key footage using the **T-BAR**, rather than pressing **PLAY**.

Using Freeze and Other Input Effects

You can apply Input Effects (including Freeze) to the background footage, but *not* to the keyed footage.

- To apply the freeze effect, press **FREEZE** either before or after pressing **CHROMAKEY** or **SHIFT+CHROMAKEY**.

- To apply any of the other Input Effects, apply them to the CURRENT source *before* pressing **CHROMAKEY**. The MX-4 DV ignores effects applied to the NEXT source during chromakey.

Fine-Tuning Key Colors

You can fine-tune the chroma key effect so that more or less of the keyed footage gets keyed. You can separately adjust the range of colors and video brightness that gets keyed.

- To adjust the *brightness* range, enter **SHIFT+UP ARROW** to increase the range of brightness values that get keyed, replacing more of the keyed footage with the background footage. Use **SHIFT+DOWN ARROW** to decrease the brightness range, reducing the portion of the image that gets keyed.

- To adjust the *color range*, enter **SHIFT+RIGHT ARROW** to increase the range of colors that get keyed, replacing more of the keyed footage. Use **SHIFT+LEFT ARROW** to decrease the range of key-colors, reducing the portion of the image that gets keyed.

Ending Chroma Key

When you finish using chroma key, press **CHROMAKEY**.

NOTES

LEARN MODE

In Learn Mode, the MX-4 DV "remembers" most of what you do, such as which transitions you used and how you used them. You can subsequently instruct the MX-4 DV to replay those steps, at which time the MX-4 DV creates the production on the output device.

The basic steps involved in using Learn mode include:

- Create a *Learned Environment*.

- Place the MX-4 DV in Learn mode.

- Create the production, complete with transitions, freezes, input effects, and so forth. The MX-4 DV records each action to a *Learned Script*.

- Instruct the MX-4 DV to replay the Learned Script.

TIP

The MX-4 DV saves Learned Environments in memory, so they are available even when you turn the unit off then back on again.

LEARNED ENVIRONMENTS

A Learned Environment can be thought of as a "snapshot" of your current the MX-4 DV configuration, including input effects, functions, styles, and so forth, that are in effect when you create the Learned Environment. You can subsequently recall a Learned Environment whenever you want to use it. You might, for example, have one environment you use for mixing three VCR input sources; another for broadcasting from live cameras; another for applying special input effects; and so forth.

You can create up to five separate Learned Environments, each with their own configuration, as shown by this illustration.

Each Learned Environment can contain an optional Learned Script.
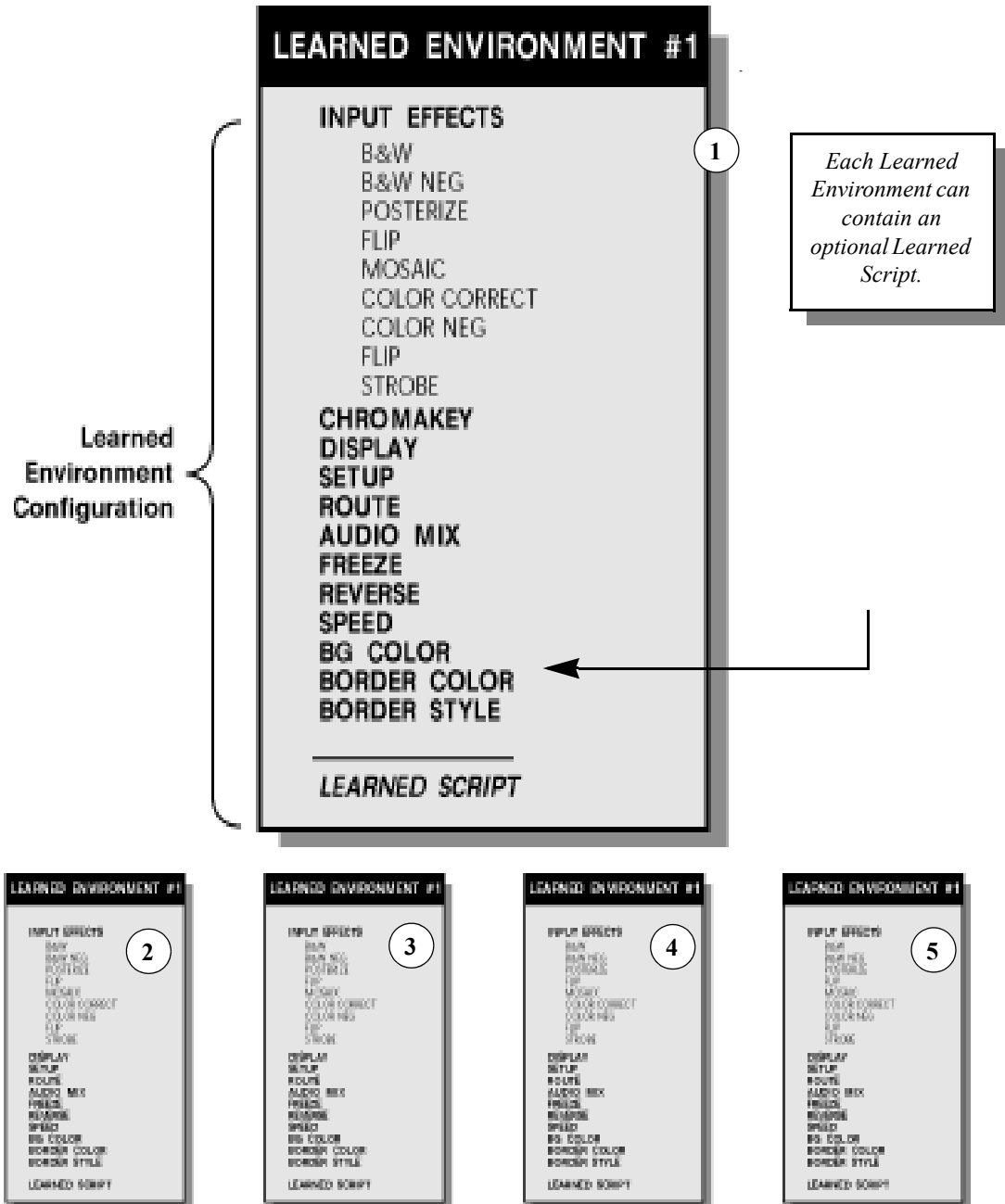
To create a Learned Environment:

1   Set up the MX-4 DV the way you want for this particular environment. This includes setting any input effects you want, selecting the initial CURRENT and NEXT sources, defining color, defining borders, and so forth.

2   Enter **LEARN+<NUMBER>**, where **<NUMBER>** can be any value from 1 to 5.

     The MX-4 DV saves all current settings under the number you enter. Note that the **INPUT EFFECTS** LED (or, light) flashes to let you know the MX-4 DV is in Learn Mode.

     At this point, you can create a Learned Script to save *with* the current Learned Environment. See the following section for further instructions.

     You can also save the environment *without* a Learned Script. To do so, just press **LEARN** to disengage Learn Mode.

LEARNED SCRIPTS

Learned Scripts exist only within Learned Environments. Although you can create a Learned Script without first specifically creating a Learned Environment, The MX-4 DV automatically creates a Learned Environment using the current settings.

Learned Scripts can have 25 actions (or, *steps*). If you attempt to exceed this number, the MX-4 DV just stops recording steps when it reaches capacity. You can replay all steps learned up to that point.

The MX-4 DV does *not* record the following steps while in Learn mode:

•   Create or transition to compose screens

•   Use Chroma Key

•   Use PIPs

•   Use the Demo

You cannot modify a Learned Script after creating it. If you need to modify a Learned Script, you must re-record it from the beginning.

If you're familiar with the video-related term "Edit Decision List," the MX-4 DV is *not* an EDL. The MX-4 DV just records certain steps, then replays them at your direction.

About Steps   Most individual actions count as one step. For example, if you enter a two-digit transition number on the keyboard, that counts as two steps: each time you press **PLAY** or use the **T-BAR**, that also counts as one step: and so forth.

Other buttons count as one step, including **SPEED**, **FREEZE**, **SETUP**, **INPUT EFFECTS**, **ARROW** keys, **CURRENT** and **NEXT** sources, and so forth.

Example…

     The following Learned Script consists of 6 individual steps:

1   Press **NEXT/B** to select that device as the NEXT source (step one).

2   Press **SPEED** to increase the speed of the transition (step two).

3   Press **SPEED** once more to increase transition speed another unit (step three).

4   Enter **55** to designate that transition (steps four and five).

5   It requires two steps to enter the two digits.

6   Press **PLAY** (step six).

⚡ TIP

*Using **ARROW** keys to select a transition consumes one step for each key pressed. In most cases, to fit as many transitions as possible into a Learned Script, use the numeric keypad to enter transition numbers rather than using the **ARROW** keys.*

*Select the CURRENT and NEXT sources before entering LEARN mode. LEARN mode interprets pressing the **CUT** button as a transition.*

USING LEARN MODE

Learn mode involves the following steps:

1   Activate all devices.

Turn on the MX-4 DV and all devices you intend to use, if necessary.

2   Press **LEARN+<NUMBER>** to engage Learn mode, where **<NUMBER>** can be any value from 1 to 5. The number designates the Learned Environment you want to use.

Note that the **INPUT EFFECTS** LED (or, light) flashes while the MX-4 DV is in Learn mode.

3   Enter production steps.

Create the production in the same way you would even if you weren't using Learn mode.

4   Press **LEARN** again to disengage Learn Mode.

Learn mode disengages automatically if you exceed 25 steps, the maximum allowed in a Learned Script.

5   Play back the Learned Script.

a   Enter **SHIFT+LEARN+<LEARNED SCRIPT #>** on the keyboard, where **<LEARNED SCRIPT #>** is the number of the Learned Environment and Learned Script you want to play back. Remember, the Learned Script numbers can range from 1 through 5, inclusive with the Learned Environment.

When this step finishes, MX-4 DV restores the selected environment and the unit is ready to play back any learned scripts.

b   Press **PLAY** or use the **T-BAR** to run each transition in a Learned Script. When you use the **T-BAR**, you can manually control any transition in the Learned Script.

The MX-4 DV begins replaying the Learned Script and displays and/or records the results to the output device. (If the MX-4 DV Preview screen is not currently visible on the Preview monitor, press **DISPLAY** until it appears.)

You can also use a GPI trigger device to play the steps in a Learned Script. A GPI trigger device works exactly the same as pressing **PLAY**. Refer to "Using a GPI Device" beginning on page 120 for more information.

🛑 CAUTION

You cannot edit a Learned Script. The only way to change a Learned Script is to re-enter it from the beginning. If you create a Learned Script and begin entering commands, the MX-4 DV OVERWRITES the previous script.

OTHER USEFUL INFORMATION

When the MX-4 DV comes to the end of a Learned Script, it stops. You can re-initiate the same or any other Learned Script by entering **SHIFT+LEARN+<LEARNED SCRIPT #>** for the script you want to run.

You can do the following in a Learned Script:

- Perform transitions, including use of Reverse and Speed settings.
- Choose CURRENT and NEXT sources.
- Use the Freeze function.
- Transition audio, video, or both.

You *cannot* do the following in a Learned Script:

- Create or transition to Compose screens.
- Use Chroma Key.
- Use the Demo.
- Use PIPs.

The MX-4 DV memorizes a manual transition (such as when using the **T-BAR**) as an automatic transition at the currently set speed — that is, it is remembered as if you had used the **PLAY** button rather than the **T-BAR**.

The MX-4 DV erases a Learned Script when you overwrite an existing Learned Script.

ABORTING A PLAYBACK SESSION

Once the MX-4 DV begins playing back a Learned Script, you can abort the playback session by pressing **LEARN**.

Once you end playback of a Learned Script, the **PLAY** button and **T-BAR** act normally, playing the effect indicated on the screen rather than the Learned Script.

NOTES

WORKING WITH AUDIO

The **MX-4 DV** provides flexible control for audio sources. You can:

- Easily switch between devices.
- Record video **and/or** audio from a device, in any combination.
- Allow or disallow transitions to affect audio.
- Automatically or manually fade the sound between sources.
- and more…

Before using audio sources, make sure they are properly connected to the MX-4 DV. Refer to Chapter 3, *Installing the MX-4 DV*, for instructions. You might also have to visit the Route menu to set up the audio devices correctly. Refer to "Route" beginning on page 73 for more information and instructions.

AUDIO DEVICES YOU CAN USE

You can:

- Use *dedicated* audio input sources, such as audio cassette players, compact disc players, and even live microphones. (Refer to "Using a Microphone with MX-4 DV" on page 30 for installation instructions.)

- Use the audio signal coming from *combined* input sources, such as the audio track contained on a video tape.

- Separate the audio signal to record only the audio track from a video tape, laser disk player, and so forth.

WAYS YOU CAN CONTROL AUDIO

Basically, you can:

- Control the way audio transitions between scenes.

- Mix the audio coming from input sources

CONTROLLING AUDIO TRANSITIONS

You control audio transitions somewhat the same as video transitions. However, the MX-4 DV gives you the ability to control audio and video separately. The two components for managing audio transitions are the **VIDEO/AUDIO** selector (on the keyboard) and the top of the Preview screen.

VIDEO/AUDIO Selector

Small lights appear above and below the **VIDEO/AUDIO** selector labeled **VIDEO** and **AUDIO**. The lights tell you whether the next transition will affect the video, the audio, or both. By pressing the **VIDEO/AUDIO** selector you can choose between the following states:

- To have the next transition affect both the video and audio, press **VIDEO/AUDIO** until both lights are on.

- To have the next transition affect only the audio (leaving the video unaffected), press **VIDEO/AUDIO** until only the **AUDIO** light is on.

- To have the next transition affect only the video (leaving the audio unaffected), press **VIDEO/AUDIO** until only the **VIDEO** light is on.

You'll learn more about using the **VIDEO/AUDIO** selector to achieve a sound mix under "Ways to Use Audio" starting on the next page.

Selecting Audio Sources

Select audio sources the same way you select video sources, using the CUT and NEXT buttons and the highlights at the top of the Preview screen.

CURRENT Audio Source

Indicates that source can be monitored through the MX-4 DV's headphone jack
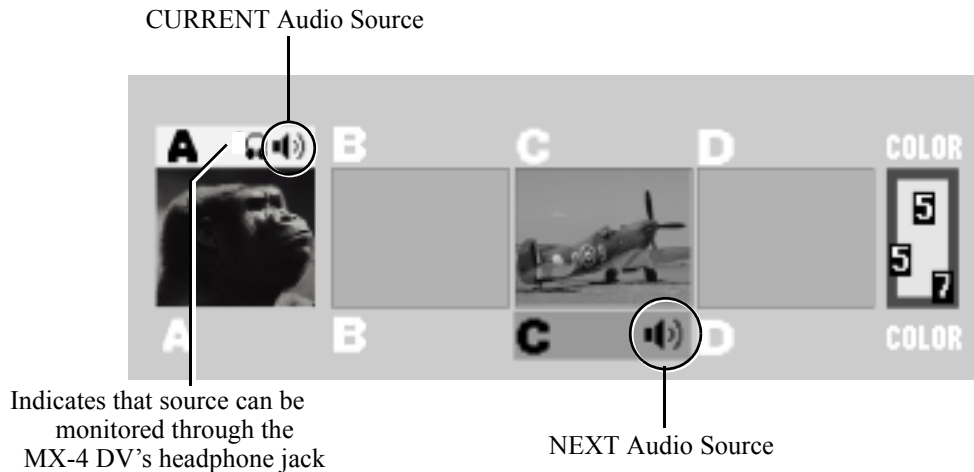
NEXT Audio Source

Remember, the MX-4 DV highlights the CURRENT video source in yellow (above the Preview window). The speaker icon inside the highlight indicates that the current audio is on channel A. The MX-4 DV highlights the NEXT video source in green (below the window). The speaker icon in this location means after you run the next transition, channel C's audio plays through.

In addition, the headphones icon indicates you can monitor this particular audio through the MX-4 DV headphone jack, located on the rear of the unit.

WAYS TO USE AUDIO

You can manage audio in several different ways during video transitions. This section explains some of the more useful methods.

Audio Accompanies Video

When you transition from one source to another, you might want the *native* audio (that is, the sound recorded on the original media) to transition right along with the video.

Example…

Suppose you want to dissolve from a shot of a car arriving in front of a house to a shot of the person entering the house through the front door. In this case, you might want to hear the car drive up, then hear the door to the house open.

To have audio accompany video and follow the same transition:

1   Set up the CURRENT and NEXT sources, and choose a transition.

2 Press **VIDEO/AUDIO** until both the **VIDEO** and **AUDIO** lights are on.

3 Press **PLAY** or use the **T-BAR** to run the transition.

Both the video and audio transition together. The audio mixes together — that is, audio from the first video scene fades away gradually as the audio from the next scene fades in and mixes with the original audio.

You can control the duration of the fade by adjusting the speed of the transition. A slow transition fades the sound slowly, whereas a fast transition fades the sound quickly. (Refer to "Changing Transition Speed" on page 56.) If you use a Cut transition, the sound switches abruptly.

Continuous Audio

Example…

> *Suppose you taped a musical concert using two cameras. The first camera focuses on the musicians and picks up the audio. The second camera focuses around the audience to get the reactions of different listeners. You want to mix together the footage from both cameras, but have only the audio from the first camera play through all transitions.*

To use continuous audio:

1 Set up the CURRENT and NEXT sources, and choose a transition.

Assume the tape from the first camera is on channel A, and the tape from the second on channel B. Press **CUT/A** to make it the CURRENT source, press **NEXT/B** to make it the NEXT source.

2 Press **VIDEO/AUDIO** until only the **VIDEO** light is on.

This tells the MX-4 DV that when the transition runs, only the video changes. For example, press **CUT/B** to cut to the video of the audience. The audio continues to come from channel A.

3 Continue pressing **CUT** (or using other transitions) to switch back and forth between the stage and the audience. The audio will remain with channel A.

USING THE AUDIO MIXER

The MX-4 DV Audio Mixer provides extensive control over all audio channels. You can, for example, subdue the audio on one channel (such as background music) and pump up the audio on another (such as the narrative).

To access the Audio Mixer, press **AUDIO MIX** in the Functions button group.

Gain Slider   Line Out Slider

Background Mix Slider   Phone Slider
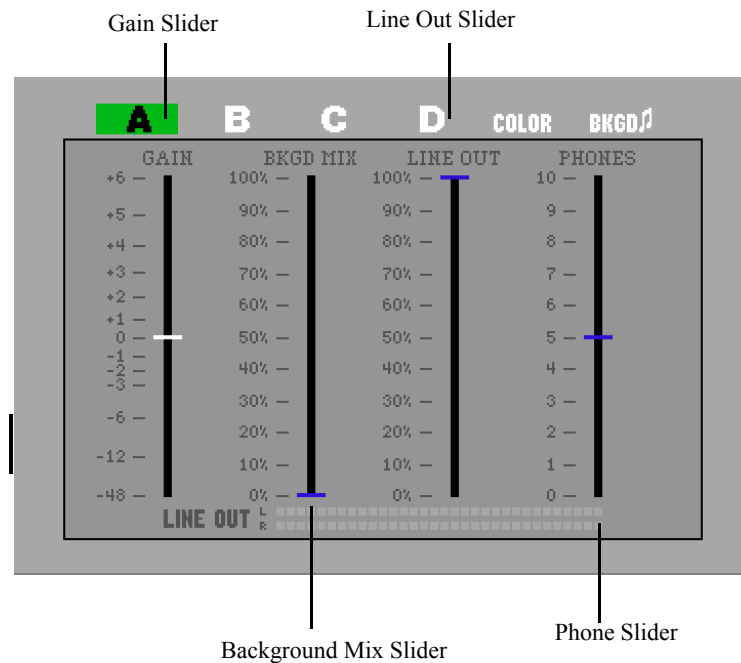
Gain Slider — Control the audio on the four standard MX-4 DV selected channels — A, B, C, D, Background, and Background Music.

Background Mix Slider — Controls the mix between the Background Music channel and the current channel audio.

TIP

If Background Audio is not being used, be sure to set the Background Mixer slider all the way down.

Line-Out Slider — Controls the output of the main out line.

Phones Slider — Controls the output through the MX-4 DV headphones jack. Note that the headphones monitor only one channel at a time, except during transitions.

Audio Mixer Controls

The following tables explain how to operate the Audio Mixer controls from the MX-4 DV keyboard.

Table 12: Selecting Mixer Channels

To…	Use these keys…
Select consecutive sliders	**LEFT ARROW** and **RIGHT ARROW**
Select a specific channel	**NEXT/A** **NEXT/B** **NEXT/C** **NEXT/D** **NEXT/BACKGROUND** **SHIFT+NEXT/BACKGROUND**

Table 13: Adjusting Audio Levels

To…	Use these keys…
Raise level one tick	**UP ARROW**
Lower level one tick	**DOWN ARROW**
Raise level ten ticks	**SHIFT+UP ARROW**
Lower level ten ticks	**SHIFT+DOWN ARROW**
Raise/Lower level arbitrarily	**T-BAR**
Restore previous slider position	**SHIFT+OK**
Restore factory default	**SHIFT+0 (ZERO)**

Using Background Audio

To control the level of the music, use the Background Music slider in the Audio Mixer. Use the keyboard controls shown in the preceding table to adjust the audio level.

Depending on how you set things up, the CURRENT source transitions to the NEXT source and the background music plays uninterrupted between them. The audio from the CURRENT and NEXT sources normally follows the video transitions—for example, if you set up a dissolve transition, audio from the CURRENT source fades away, then the audio from the NEXT source fades in.

USING HEADPHONES

You might find headphones helpful for monitoring audio input signals. You can plug a set of headphones directly into the MX-4 DV by connecting them to the headphone jack located on the rear panel of the unit. Headphone audio is stereo.

Normally, headphones carry only the main sound, that is, the sound coming from the CURRENT input source. You can, however, monitor the sound from the NEXT source without disturbing the audio going to the output device.

To monitor the audio on the NEXT source:

• Press **SHIFT+AUDIO/VIDEO.**

Each time you press **SHIFT+AUDIO/VIDEO,** you toggle between the audio on the CURRENT source and that on the NEXT source.

ADVANCED AUDIO STEPS

If you have an external audio mixer device available, FOCUS Enhancements recommends you use that device to manually control all sound. you can:

• Connect the external mixer's output to any MX-4 DV audio input, and permanently set that source as your sound input source. This lets you use the external mixer when you need flexibility, or use the MX-4 DV when you want control of the audio. The latter gives you the ability to perform more activities, like fading audio automatically when video transitions run.

• Meter line out, which is not necessarily the source you're working on. For example, suppose the Program out is on Source A, but your adjusting the gain for Source B. You won't see that reflected in the LED meter (if Source B was on the program out you would). The line out slider should affect the meter.

USING THE ANALOG AUDIO ADJUSTMENTS FUNCTION

Use the Audio Adjustments Function to adjust the analog audio input levels and add delay to the analog or DV audio path. These are advanced functions and most users should leave the system set to its default settings: 0dB gain and 2.25 fields of delay. Use these functions if you need fine control over your audio inputs or to compensate for video delays that may have occurred in other devices in your video stream.

To display the Audio Adjustment screen, press **shift+audio mix**. The four slider groups represent the four analog and DV audio inputs on the rear of the MX-4 DV: IN1, IN2, IN3, and IN4. DV audio adjustment can be applied to each input by adjusting he second "DELAY" slider. Make the proper adjustment depending upon which analog or DV output has been selected in the Route menu.
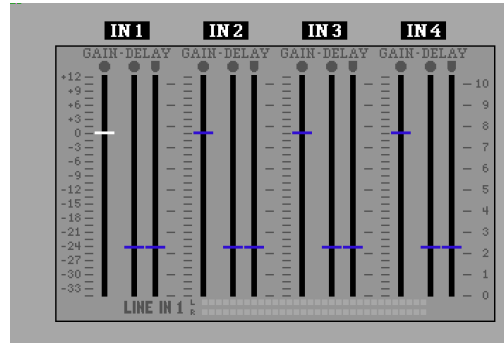
Selecting Manual Levels

To make manual adjustments to the input audio level for your analog sources:

1 Use the **left arrow/right arrow** keys to select the audio source (IN1, IN2, IN3, or IN4). Make sure you're on a gain slider.

2 Use the **t-bar** or the **up arrow/down arrow** keys to adjust the Audio Levels to the desired settings. You can also use the **shift+up/down** arrow keys to make fine adjustments.

Another option is the **shift+up/down arrow** keys to make fine adjustments.

The adjustment range is the same for all inputs: +12.0dB to -33.5dB.

Selecting Audio Delay

The audio delay values show the amount of delay, in video fields to be applied to each source. The maximum delay is ten fields (PAL is 8.5).

Because analog audio and video travel in different paths in audio/video equipment, the audio and video can become separated. Typically, the video is delayed in relation to the audio. For example, if video is delayed, you might hear someone clap, then a moment later see the hands come together. Usually the difference is so minimal that no adjustment is needed. However, if an adjustment is needed, you can delay analog audio up to five fields with this parameter.

To adjust the audio delay for your analog sources:

1 Use the **left arrow/right arrow** keys to select the audio source (IN1, IN2, IN3, or IN4) and analog or DV delay adjustments. Refer to "Using the Analog Audio Adjustments Function" on page 113 for further details.

2 Use the **t-bar** or the **up arrow/down arrow** keys to adjust the delay to the desired settings. You can also use the **shift+up/down** arrow keys to make fine adjustments.

ADVANCED OPERATIONS

This chapter discusses operations you might not use very often, but are quite helpful when you need them. They include:

- Using Titles with the MX-4 DV
- Using Color Bars
- Performing Roll Edits
- Operating in Live Environments
- Security Monitoring
- Using a GPI Device
- Resetting the MX-4 DV to Factory Defaults
- Connecting the MX-4 DV to a network using Ethernet

USING TITLES

In Chapter 3, *Installing the MX-4 DV*, you learned how to install a character generator (**CG**) to use with the MX-4 DV (refer to "Live Broadcast Configuration" on page 38). Using a setup where you connect the CG between the MX-4 DV and the output device (downstream), you can create titles for your productions. Using any of the Videonics TitleMaker products, you can superimpose titles over video and use transitions for sophisticated titling.

With a Videonics TitleMaker you can create high-quality, professional-looking titles for your productions.

Most CG's work in similar ways. Following is an example using a Videonics TitleMaker.

1   Use TitleMaker to create the pages you need for the titles.

2   Insert a blank page between each title page. The page should not contain any characters, its background should be set to video, and its duration should be set to infinite.

3   Press **PLAY** on the TitleMaker and the next title page appears superimposed over the MX-4 DV output.

     At this point, you can run a transition and the title continues to superimpose while the transition runs.

You can also use other TitleMaker features, such as tinted backgrounds, patterns, scroll, and crawl. Because the MX-4 DV's TBC (**T**ime **B**ase **C**orrector) creates a stable time base, TitleMaker can lock to it securely to produce an excellent picture.

USING COLOR BARS

The MX-4 DV provides a set of standard color bars built into the unit. You can display the color bars on the Preview monitor.

To display the built-in color bars:

1   Press **COMPOSE**. The MX-4 DV enters Compose mode, and a flashing rectangle appears.

2   Press **SHIFT+NEXT/BACKGROUND**. A set of color bars appears on the Preview monitor.

3   Press **PLAY** to apply the color bars to Program out.

4   Press **COMPOSE** to remove the color bars and exit Compose mode.

PERFORMING ROLL EDITS

Two types of roll edits are commonly used in video editing — **A/A** rolls and **A/B** rolls. You can do both types of rolls with the MX-4 DV. A/A rolls can be accomplished with relative ease. As you'll learn later in this section, you can also do A/B roll editing with the MX-4 DV, although it does require good preparation and manual control of the devices.

Cutting Between Scenes

Simple cuts between scenes do not require special features. All you have to do is pause the recording VCR at the end of one scene, then release pause when the next scene begins.

A/A Roll Edits

A/A roll edits can be defined as Single-Source editing because all of the original materials come from a single videotape. The MX-4 DV offers special features designed specifically for these types of situations.

An easy way to add interest to a single-source transition is to use the A/A roll edit (sometimes called an A/X/A edit). In this situation, the video freezes at the end of one scene, then a dissolve or other effect transitions to the next scene.

Example…

You are producing a murder mystery. The door opens and the villain sneaks into the room. Slowly he moves toward the camera, then you press FREEZE *to freeze the killer's menacing glare!*

Next, you pause the recorder and set up the MX-4 DV to perform a dissolve. Then you find the next scene and start it playing a bit before the scene starts. There's the victim — it's granny, sitting in a rocking chair with her back to the camera. You start the recorder. It's still recording the frozen picture. At the correct moment you transition from the frozen close-up of the murderer to granny in her chair. As the killer's face dissolves away, granny turns and we discover it's the constable, ready to arrest the scoundrel!

To perform a roll edit such as this:

1 Roll the tape and press FREEZE at the appropriate moment to freeze the end of the scene.

2 Pause the recording device.

3 Set up the transition you want.

4 Position the source tape just before the next scene and let the scene play.

5 Release pause on the recording device to record more of the frozen picture.

6 At the appropriate moment, run the transition between the frozen picture and the rolling video from the next scene.

This type of A/A roll works best when the recording device has flying-erase heads — a feature that lets the VCR make a clean break when you pause the recording.

You can perform an A/A roll with an automatic editing system. Press FREEZE at the end of one scene and wait for the editing system to start the next scene. While the controller locates the next scene, set up the transition you want. When you see the editor release the recorder from the pause state, press PLAY on the MX-4 DV to run the transition.

Limitations on A/A Roll Transitions   Transitions might not produce the impact you want when the frozen picture is similar to the incoming video. Experiment with various transitions to determine which ones produce the results you want.

A/B Roll Edits

A/B roll editing involves editing scenes from multiple sources. When doing A/B roll edits, you must manually synchronize the sources so that they are timed correctly.

Normally, you record a countdown before each scene so you know when it starts, then back-time the transition accordingly.

Example…

Scene 1 is playing on VCR A. You know it ends soon, so you start VCR B, and pause it at a point 5 seconds before its action starts. When VCR A is 5 seconds from its end, you release VCR B and let it roll. At this point, both VCR A and B are rolling. At the desired moment, you perform the transition from VCR A to VCR B.

Another method of A/B roll editing involves the use of working copies. You copy the original footage to new tapes, placing every other scene on a different tape. The result might look similar to this:
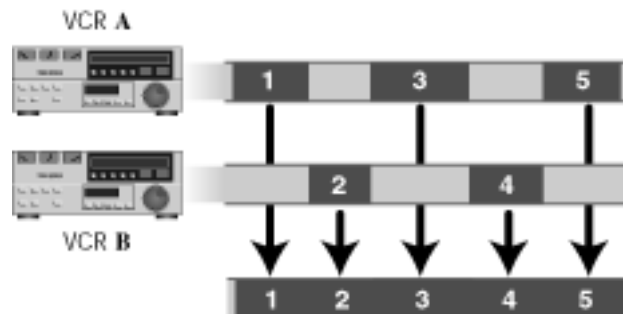
Accurate placement of the scenes (1 through 5 in this example) allow both tapes to roll simultaneously so you can transition between scenes without having to start and stop each VCR at the correct moment in time. When you want to use a transition between scenes, you should overlap them by a couple of seconds to ensure the proper effect.

The advantage to this method is that it makes it easy to get exactly what you want on tape. It has two disadvantages, however — (1) it requires careful preparation and planning, and (2) it requires an extra "generation" in the tapes (that is, productions are a copy of a copy rather than a copy of the original).

Transitions TO and FROM Solid Colors

You can insert a solid color background between two scenes for impact. For example, scene one dissolves to solid black, holds briefly, then dissolves from black to the next scene.

To run this type of transition:

1   Assume your CURRENT source is on Channel A — press **CUT/A** to ensure it is the current one.

2   Select the transition you want to use from the Transitions Menu — in this example, select a slow dissolve.

3   Press **NEXT/BACKGROUND** to activate the Color Selector on the Preview screen.

4   Press **BG COLOR** as many times as necessary to make the background black.

5   Press **PLAY** to run the transition and fade to black.

6   Assume your NEXT source (the one you are transitioning into) is on Channel C — press **NEXT/C** to make that the next source.

7   Select the transition you want to use from the Transitions Menu — again, for this example select a slow dissolve.

8   Press **PLAY** to transition from solid black to Channel C.

⚡ TIP

Use a wipe or dissolve to and from a solid colored background to indicate passage in time, a change in mood, or a change in scenery. For example, a red background might indicate anger or frustration; light green might indicate an open forest (tranquility) and dark green a rain forest (somber and cool).

Transitions to Modified Sources

Use the MX-4 DV's Input Effects to create a modified version of a source. This lets you transition between the modified and unmodified versions. For the following procedure, assume you want to flip a source image to create a *mirror image*.

To run this type of transition:

1   Use the MX-4 DV's Route function to make the same source appear on two different channels. For example, route channels A and B to IN 1 on the ROUTE screen. (Refer to "Route" on page 73.)

2   Enter **SHIFT+FLIP** (horizontal) to apply the effect.

3   Select a transition (such as number 6) to run between channels A and B.

4   Press **PLAY** or move the **T-BAR** to run the transition.

Prior to running the transition, the source appears normal. After running the transition, the source appears as a mirror-image of itself.

OPERATING IN LIVE ENVIRONMENTS

In most live environments you need the ability to quickly and easily switch between the various live feeds. The MX-4 DV serves this need well because you can view the four input sources on the Preview screen and easily run transitions from the CURRENT to the NEXT feed simply by pressing **PLAY** or moving the **T-BAR**.

SECURITY MONITORING

The MX-4 DV also serves well for monitoring security cameras. For example, you might set up four different cameras and train them on areas that require security coverage. The Preview screen shows small images from each camera. Switch to FULL Preview (**SHIFT+3**) to see larger previews from all cameras. When you want to see a full screen image of a specific area, simply press the **CUT** button for that camera.

USING A GPI DEVICE

You can connect a GPI (**G**eneral **P**urpose **I**nterface) device to the MX-4 DV. The GPI device can trigger an event from an external source, such as a push-button switch or an edit controller with GPI output. A GPI device is especially useful when you are positioned some distance away from the MX-4 DV but still want to be able to control its operation.

A GPI pulse causes the MX-4 DV to behave exactly as if the play button were pressed. Normally, it starts a transition you previously set up. If you are playing back a Learned sequence (refer to Chapter 11, *Learn Mode*), it triggers the next event in the sequence.

An edit controller or computer that provides a contact closure can also serve as a GPI triggering device.

🛑 WARNING ————————————————————————

Do not connect a power source of any kind to the Control GPI input connector on the MX-4 DV. Doing so can damage the equipment and void your warranty.

You can use a remote push-button device to trigger events on the MX-4 DV. If you already have a GPI device you want to use, refer to "Live Broadcast Configuration" on page 38 to learn how to connect the device. If you do not have a GPI device but would like to build one, refer to the instructions in the next section.

INSTRUCTIONS FOR BUILDING A GPI TRIGGER

This section contains a diagram of the GPI Trigger Button you can build and all associated instructions.

Required Tools and Parts
Soldering Iron and Solder
Wire Cutters
Electric Drill

Parts Required

A "normally open momentary push-button switch" (**A**).

One four-inch piece of 3/4-inch PVC pipe (**C**) and two end caps (**B** and **E**).

3-conductor, 22-24 gauge stranded wire cable (**D**).

A stereo 3.5-mm mini-pin plug (**F**)
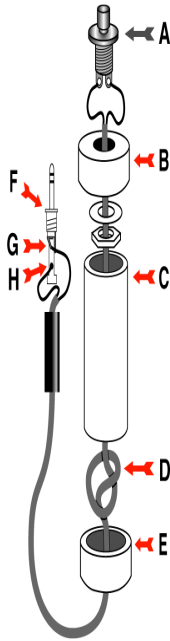
Instructions

1   Drill a 1/4-inch hole in the center of one PVC end cap (**E**) and a hole to match the push-button switch in the other end cap (**B**).

2   Feed one end of the cable through the end cap with the 1/4-inch hole (**E**) and strip the end of each wire.

3   Tie a single knot (**D**) about 8 inches from the end of the wire.

4   Slide the wire through the PVC pipe, the nut and washer, and the other end cap (**B**).

5   Solder the two wires at the knotted end to the two poles on the switch (**A**).

6   Slip the switch into the end cap and secure it using the nut and washer.

7   Solder the other ends of the cable to the plug (**F**).

8   Connect to the tip (**G**) and the base (**H**) of the plug. Don't connect anything to the middle section of the plug.
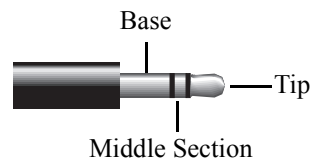
9   Push the end caps in place.

10 After you've tested the unit, you can cement the end caps (**A** and **E**) into place, if you want.

11 Solder the wires of the other end of the cord to the poles from the tip and base of the stereo mini-pin plug (**F**). If you aren't sure which poles are which, ask at the store when you make the purchase.

12 Plug your new remote trigger plug into the GPI jack on the MX-4 DV rear panel.

Using a GPI Trigger Device

If your edit controller is automatic and has a GPI trigger, you can trigger each page in a project with the controller. You might need a special cable to connect the GPI jacks from the GPI device to the MX-4 DV.

⚠️ WARNING

Always turn off power before plugging into any GPI jack.

The following instructions explain how to automatically trigger events using the device described above. Instructions for other devices should be similar, but you should check the device instructions beforehand.

To use a GPI device as a trigger:

1 Connect the GPI device to the MX-4 DV using an appropriate cable.

2 Press the GPI trigger button when you want to trigger an event. You can trigger events between scenes or anywhere in the middle of a scene. You can also trigger each event in a Learned Script (refer to "Learned Scripts" beginning on page 103).

3 With the appropriate setup menu value, you can use the mixer to trigger other products (like a Videonics TitleMaker).

RESETTING THE MX-4 DV FACTORY DEFAULTS

When you first power up the MX-4 DV, it operates using settings defined by FOCUS Enhancements. As you go about using the MX-4 DV and changing its various settings, the unit stores your settings in its memory (called NVRAM). You can reset all settings to their factory defaults.

To reset the MX-4 DV to its factory defaults:

1 Power down the unit (using the Power switch).

2 Press down and hold the **SHIFT+SETUP/FTP** buttons.

3 Turn on the MX-4 DV's Power switch.

4 After the unit powers up and you see the Preview screen, release all buttons.

ℹ️ NOTE

A factory reset will not restore the original background and foreground jpegs which are included when the MX-4 DV is shipped. Refer to the included CD or *www.focusinfo.com* to re-download the original 12 inch Design graphics if desired. Apply the **SHIFT+ROUTE** keys after powering down the unit to remove all current jpegs on the system if desired before powering up again to import new ones.

CONNECTING WITH ETHERNET

Network your MX-4 DV to a PC or a Macintosh using the included crossover cable. Copy the following to and from the MX-4 DV:

• Background and Foreground jpegs

• Operating software

To work on a standard Ethernet network, each MX-4 DV requires an unique IP address. This address and associated information can be static (assigned and typed in), or dynamic (assigned by a DHCP server). Do this by pressing the **SHIFT**+**SETUP/FTP** buttons to access the ftp menu. The example screen shot shown below represents the beginning setup screen to apply a static or dynamic IP address.

```
Current IP: (static)

0.0.0.0

IP:[0].0.0.0

MASK: 0.0.0.0

GATEWAY: 0.0.0.0

PASSWORD:
```
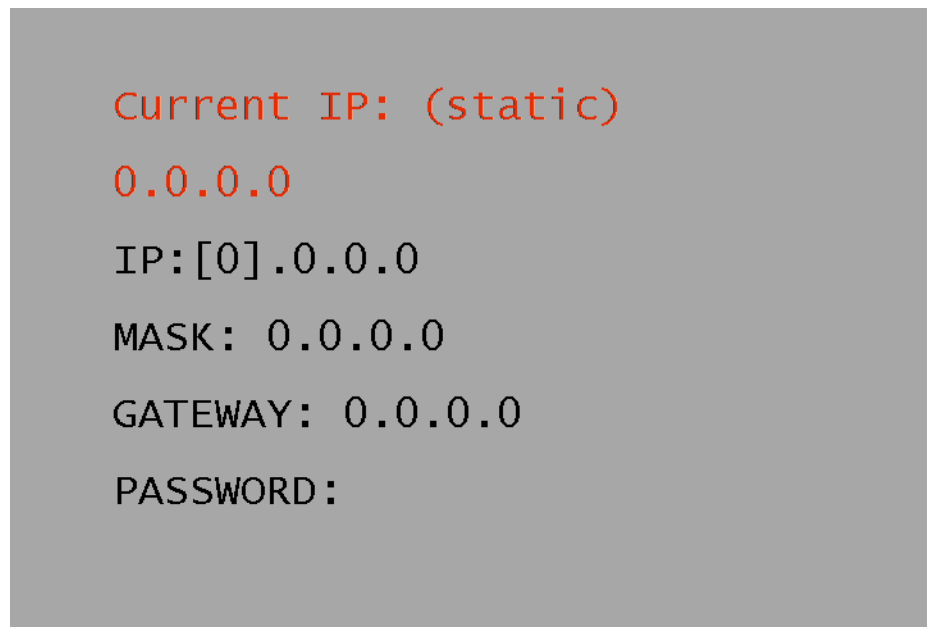
To connect to a network (Static IP):

1 Power down the MX-4 DV.

2 Connect the MX-4 DV to your network with the included crossover cable to either a PCs or a Macintosh computer.

3 Power up, and assign the IP and Mask. The Gateway and Password are not needed to perform this function.

FOCUS Enhancements recommends you use one of the following IP address for static input:

• 192.168.0.2

• 192.168.0.3

• 192.168.0.4

ℹ NOTE

192.168.01 will not function in this system.

4 Reboot for the changes to take effect.

5   The MX-4 DV is now networked, and it should be visible as an FTP device.

```
Current IP: (static)
192.168.1.3
IP:[192].168.1.3
MASK: 0.0.0.0
GATEWAY: 0.0.0.0
PASSWORD:
TIME: 21:09:15 (9pm)
DATE: 12/05/2004
```

IP Setup for a Computer or Laptop

To set up your PC to communicate with the MX-4 DV (Static IP address):

Win98SE/Win2000/XP Pro/WinT40/WinT40 Server

1   Plug in the crossover cable (R5) to the MX-4 DV Ethernet port and your computer's Ethernet port.

ℹ️ NOTE

A **straight cable** has the same wire configuration colors on each end.
A **crossover cable** has two different wire configuration colors on each end.
Make sure to use the included **crossover cable** if you are working with a PC.

2   On your computer, select **My Network Places** from the desktop and right click and select **Properties**.

      a   Select **Local Area Connection** and click **Properties**.

    b   Select **TCP/IP** and click **Properties**.

3   On the Internet Protocol (TCP/IP) Properties screen or identified as the Network screen for Windows 95/98, switch the default selection from **Obtain an IP Address Automatically** to **Use the Following IP Address** and type in the following IP address: **192.168.1.2**. Press the TAB key.

The subnet mask information should be automatically filled in the blank space. If not, fill in the subnet mask blank space with the following: **255.255.255.0**.

ℹ️ NOTE ────────────────────────────────

If you have selected the **ADVANCED** button before typing in the subnet mask (or pressing the TAB key), you will be taken to a new window asking you to input the subnet mask. The correct subnet mask number will appear next to the IP address. Select **OK** and the subnet mask blank space will be filled.

---
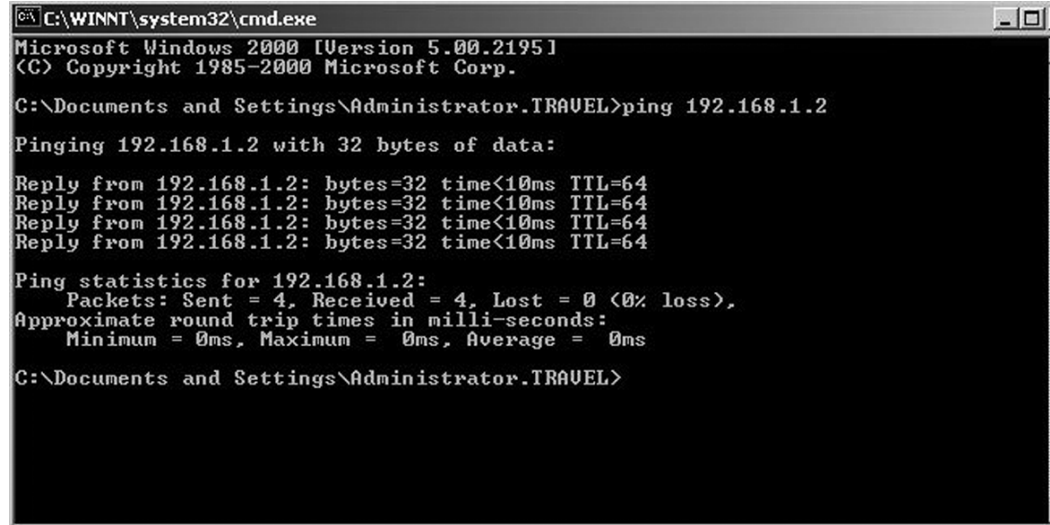
4   On the MX-4 DV, use **SHIFT+SETUP/FTP** to enter the IP Address Screen. In the "IP" section, enter the following IP address: **192.168.1.3**. Click **OK**.

5   Reboot the MX-4 DV (power off and on).

6   After the MX-4 DV has rebooted, press **SHIFT+SETUP** to enter the IP Address Screen. The new IP address (192.168.1.3) is displayed in **RED**.

7   Restart the computer. When the Name and Password screen appears, select cancel.

ℹ️ NOTE ────────────────────────────────

Do not enter your name and password at this time.

---

8   Select **Start** (from the bottom tab bar) and then **Run**. When a new window appears, type **cmd** or **command** in the Open blank and click **OK**.

     A new MS-DOS window appears with C:\Documents and Settings> in the command line.

9   Type the following in the command line: **ping 192.168.1.2**. (Make sure there is a space between ping and 192.) Press the ENTER key and a ping test is executed. The reply messages should appear similar to the following screen.

```
C:\WINNT\system32\cmd.exe                                    _|□|
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\Documents and Settings\Administrator.TRAVEL>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<10ms TTL=64
Reply from 192.168.1.2: bytes=32 time<10ms TTL=64
Reply from 192.168.1.2: bytes=32 time<10ms TTL=64
Reply from 192.168.1.2: bytes=32 time<10ms TTL=64

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms

C:\Documents and Settings\Administrator.TRAVEL>
```

10   Type the following command on the command line: **ipconfig**. Press the ENTER key. The screen displays the Ethernet IP configuration (Adapters 0, 1, and 2)

11   Double-click the Internet Explorer icon and type the following in the address line: **ftp://192.168.1.3**. Three folders should appear as shown in the following illustration. The folders are BACK (background), FORE (foreground), and MISC.
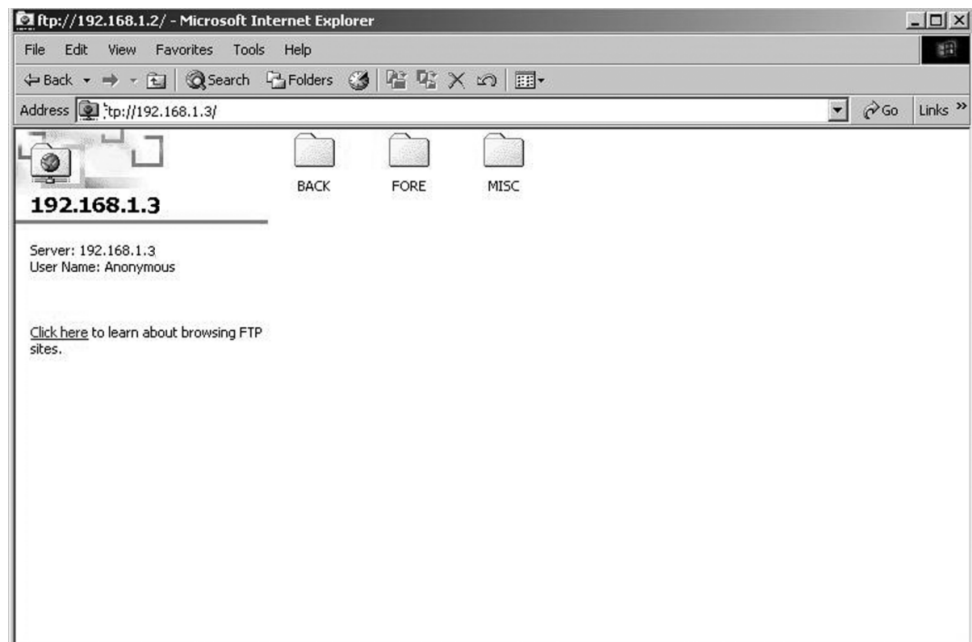
```
ftp://192.168.1.2/ - Microsoft Internet Explorer                    _|□|×
File   Edit   View   Favorites   Tools   Help
←Back ▾ → ▾ ⬆ | Search  Folders  ⬆ | ⬆ ⬆ ✕ ⬆ | ⬆▾
Address  tp://192.168.1.3/                               ▾  Go  Links »

  ⬆                              📁        📁        📁
                              BACK      FORE      MISC
192.168.1.3

Server: 192.168.1.3
User Name: Anonymous

Click here to learn about browsing FTP
sites.
```

Now you are ready to import new, updated software or jpeg images to and from your MX-4 DV. Details about how to transfer files are described in further detail in "Transferring Files TO or FROM the MX-4 DV" on page 130.

To set up your Macintosh computer to communicate with the MX-4 DV (Static IP address):

Macintosh OS 10.2.8/OS 10.3.6

1   Plug in the included crossover cable to the MX-4 DV Ethernet port and your computer's Ethernet port.
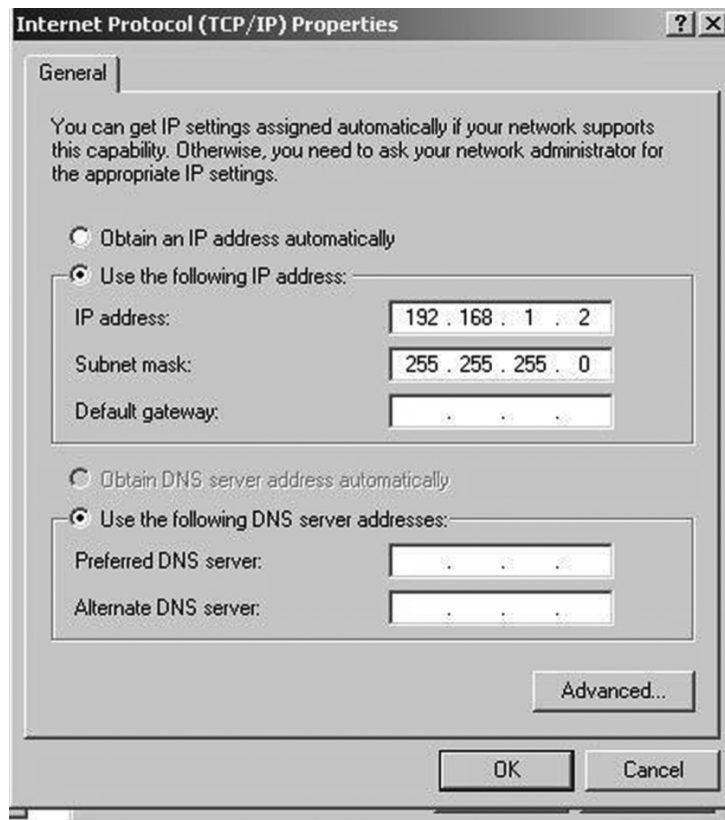
> **ⓘ** NOTE ──────────────
>
> A **straight cable** will have the same wire configuration colors on each end.
> A **crossover cable** will have two different wire configuration colors on each end.
> Make sure to use a **crossover cable** if you are working with a Macintosh computer.

2   Access **System Preferences** on the desktop using the **Apple Logo** in the right-hand corner of the screen.

3   Click the Network icon in System Preferences to access the Network page.

4   In the Network page, change the Configure IPv4 field to **Manually**.

The network page should show an IP address of 0.0.0.0.

5   Apply a universal static IP address (192.168.1.4) to allow communication with the mixer (192.168.1.3).

For example, if the mixer displays 192.168.1.3, the IP address entered on the Macintosh should be 192.168.1.4.

6   Access your Internet browser. It should display the following:
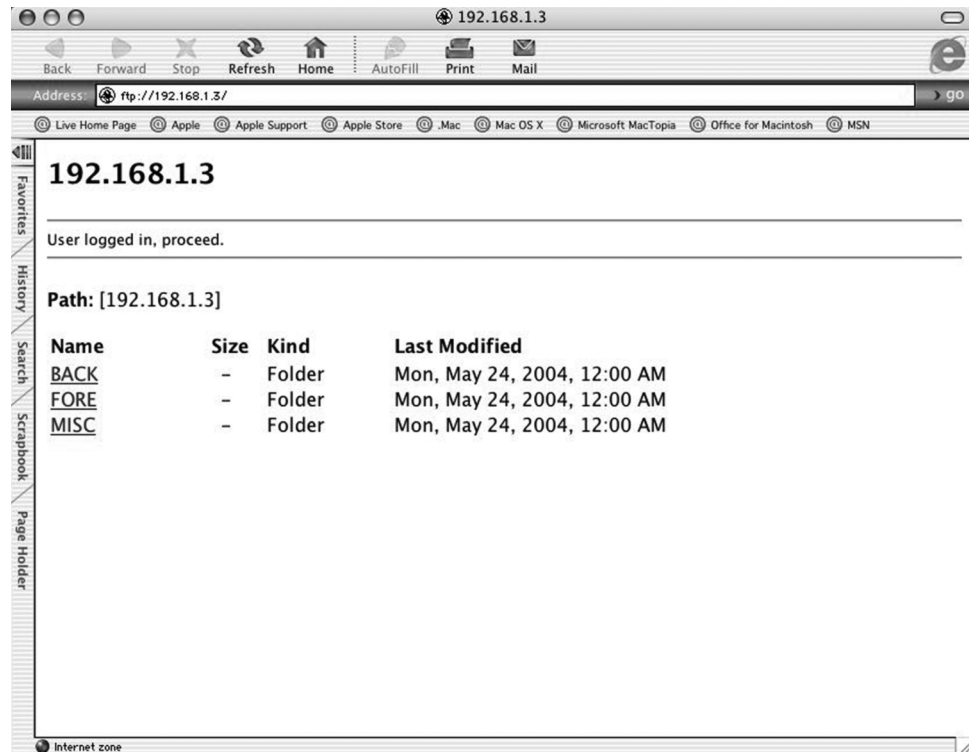
Now you are ready to import new, updated software or jpeg images to and from your MX-4 DV. Details about how to transfer files are described in further detail in "Transferring Files TO or FROM the MX-4 DV" on page 130.

To connect to a network (Dynamic IP):

1   Set the IP address to 0.0.0.0 to indicate that you want DHCP, or it will stay static.

2   Power down the MX-4 DV.

3   Connect the MX-4 DV to your network with a standard 10Base-T Ethernet cable, just as you would network a computer.

4   Power up. DHCP is the default mode. To determine if an IP address has automatically been assigned, press **SHIFT**+**SETUP/FTP.**

A non-zero number should appear on the screen. Contact your network administrator if this doesn't occur, to verify that your network has a working DHCP server.

5   To prevent unauthorized users from corrupting your system, use the password setting within the MX-4 DV ftp menu. FOCUS Enhancements recommends that while using a DHCP IP address, you arrow down and type in from your number keypad a code to lockout unauthorized users. If the password is set to "222" on the mixer, for example, then you should apply "222" to the access section of your ftp page.

The MX-4 DV is now networked, and it should be visible as an FTP device.

Additions DHCP Tips If your MX-4 DV is connected to a network and the IP address is automatically assigned to your computer, perform the following procedure:

1   Hook up a standard straight network cable between the router or hub and the MX-4 DV unit.

2   Switch on the mixer.

3   The MX-4 DV will recognize the new address assigned by the network and allow access to any browser or FTP application by typing in the address appearing on the MX-4 DV's ftp menu. (Use **SHIFT+SETUP/FTP**.)

If your MX-4 DV is connected to a network and the IP address is NOT automatically assigned to your computer or laptop, contact your Network Administrator.

Transferring Files TO or FROM the MX-4 DV

From a PC or Macintosh, communicate with the MX-4 DV using standard FTP software. A few software options are Fetch for Macintosh users or Windows Shareware for Windows users.

System Directories and Files Upon making a computer connection, you can write jpegs to, or read jpegs from the following directories: *BACK* and *FORE*.

These directories can contain 50 jpegs each. The jpegs in the *BACK* directory can be used as input or Background graphics. They should not exceed 1024x768 pixels. They will be displayed in the center. The jpegs in the *FORE* directory can be used as Foreground graphics. They will generally be smaller (180x120 pixels) and can be displayed anywhere on the screen. The image and quality at 180x120 will not be very sharp. The jpeg file names must have a number between 0 and 49 for them to be used by the MX-4 DV, for example: *FOCUS_01.JPG*. Once the jpegs have been imported with the correct file names, reboot the MX-4 DV. After restarting the MX-4 DV, it will take a few minutes to load the imported jpegs and formulate the thumbnails into the proper background and foreground menus.

ⓘ NOTE

The time it takes to load the imported jpegs into the system depends on how many jpegs were loaded at one setting.

Updating System Software

The hidden file *software* is the MX-4 DV's operating software. This file resides in the top level directory, but isn't displayed by communications software. Without this file, the MX-4 DV would power up with minimum functionality. Updating system software consists of replacing the *firmware* with a newer version. You can do this using Ethernet. Upon restart, the MX-4 DV will boot from the replacement (newer) version.

This feature allows you to easily deal with operating software upgrades. For example, you can download new operating software from the support site of FOCUS Enhancements to a networked PC. This same PC can be used to access your MX-4 DV to install the *software* file. Older copies of the operating software, as well as a library of background, foreground, and still frame jpeg images can be kept on your PC.

After changing any stored settings (IP, Mask, Gateway, or FTP password), you must perform a power cycle. To do this, remove the AC power supply, wait a few seconds, then replace it. Upon restart the new settings will take effect.

To download the latest MX-4 DV software from the FOCUS website http://.focusinfo.com/support/updates.htm:

1   Right click. Select **Save Target As** and save it to a predetermined directory or to your Windows desktop.

2   Open the FTP Explorer.

3   Click on **Tools**, then **Quick Connect**, and type 192.168.1.2 or the IP address the network assigned for the mixer. Make sure the box **Anonymous** is checked and click **SAVE**.

4   Click **Connect**. You will now see the contents of the MX-4 DV.

5   To transfer the saved software files from you computer to the MX-4 DV, drag the file over to the MX-4 DV root directory.
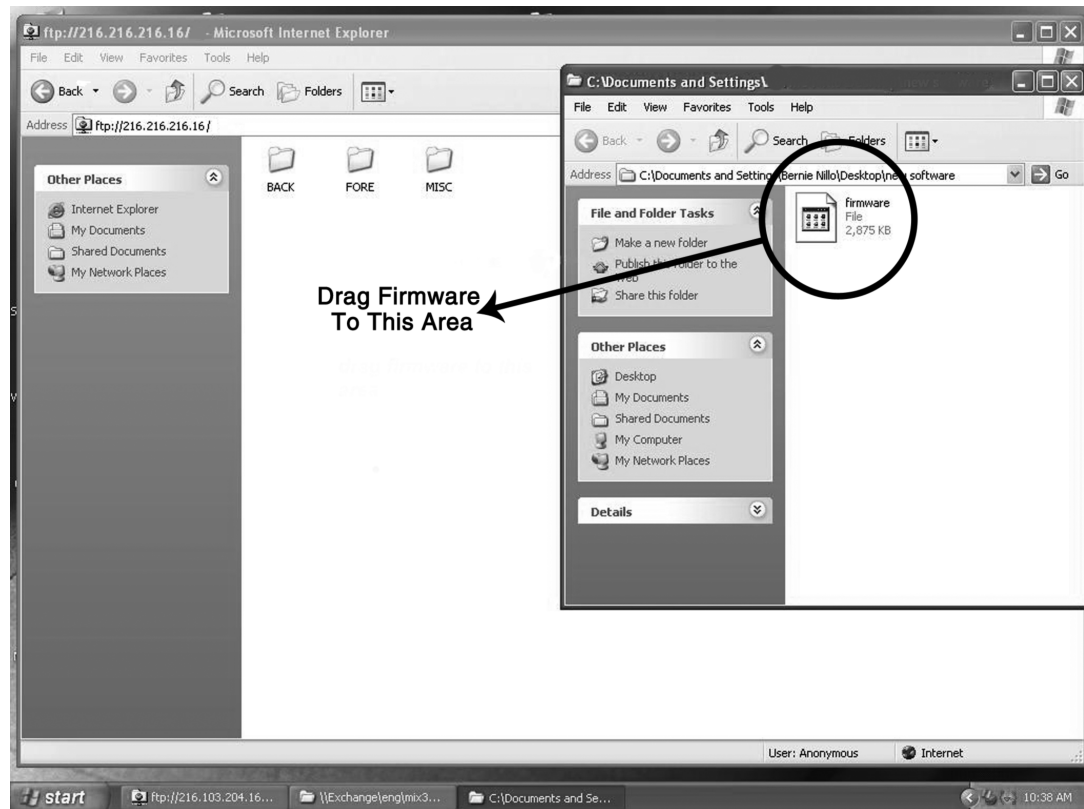
6   Click **Tools** and select Disconnect. Upon exiting this FTP program, the software will transfer to the MX-4 DV. You can also select **File** and select **Upload** and go to the directory of desktop and select the previously saved software.

7   To activate the new software, recycle the power on the MX-4 DV (power off and power on).

8   To verify the new software version, hold down the SHIFT key and press the #9 key. (Press SHIFT and the #9 key again to return to the Preview screen.)

ℹ️ NOTE

The software file is approximately 3.0 Mbytes in size. With a 56K modem, it takes about 15 minutes to download the software to your computer. ISDN, DSL, and cable modems should take less time.

Information About FTP Clients

Many http Internet browsers support the FTP protocol, but they can vary in operation. You may be able to access your MX-4 DV by just typing "FTP://000.000.000.000", where the zeros are your unique IP address. Internet browsers are also more difficult to use when the FTP host (your MX-4 DV) is set to require a password. For this reason FOCUS Enhancements suggest that you use a "real" FTP client, such as ws_ftp (Windows Shareware), or Fetch (Macintosh). The MX-4 DV networking feature was designed to be reliable in providing one-on-one connections, not in supporting multiple clients.

ⓘ NOTE ──────────────────────────────────

An example of an FTP program to upgrade the MX-4 DV's software and the transfer of files is FTP Explorer. It can be found at the following site: *http://www.ftpx.com/download.html* for Windows. Use Fetch 3.0 for the Macintosh. The instructions in this chapter are for the FTP Explorer, so they may change slightly depending upon the program you use.

TRANSITIONS LIST

This appendix shows the icons assigned to each MX-4 DV transition, and identifies them by number.

Some transition descriptions use special terms and abbreviations to describe how the transitions work.

(A) — The CURRENT source: the one on the screen before the transition begins.

(B) — The NEXT source: the one on the screen after the transition finishes.

Dissolve — One image fades away as another fades in.

Wipe — A simple window or boundary that reveals the underlying video. The video image neither moves nor changes size.

Slide — Leaves the video full size but the picture moves with the transition.

Comp, Exp — (Compress, Expand) The video resizes to fit the window. Normally, the entire picture scales to fill the window.

H, V — (Horizontal, Vertical) These refer to the direction in which the transition moves. For example, a V wipe is a horizontal line that moves vertically up or down the screen. When the effect runs in the forward (non-reversed) direction, vertical transitions move down the screen and horizontal transitions move from left to right, unless otherwise indicated.

CW, CCW — ClockWise and CounterClockWise movement.

L, R, Ctr, T, B — Left, Right, Center, Top, and Bottom, respectively.

TLC, TRC — Top Left Corner and Top Right Corner, respectively.

BLC, BRC — Bottom Left Corner and Bottom Right Corner, respectively.

"**;**" — Divides multi-step transitions. "**/**" indicates two actions that occur simultaneously.

* — The transition always uses a fixed direction when performed from frozen picture. They are not affected by the **REVERSE** button.

— The transition operates differently when performed from a frozen picture. Simpler effects are substituted automatically.

Basic Transitions

Basic Transitions (continued)

240	241	242	243	244	245	246	247	248	249
250	251	252	253	254	255	256	257	258	259
260	261	262	263	264	265	266	267	268	269
270	271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288	289
290	291	292	293	294	295	296	297	298	299
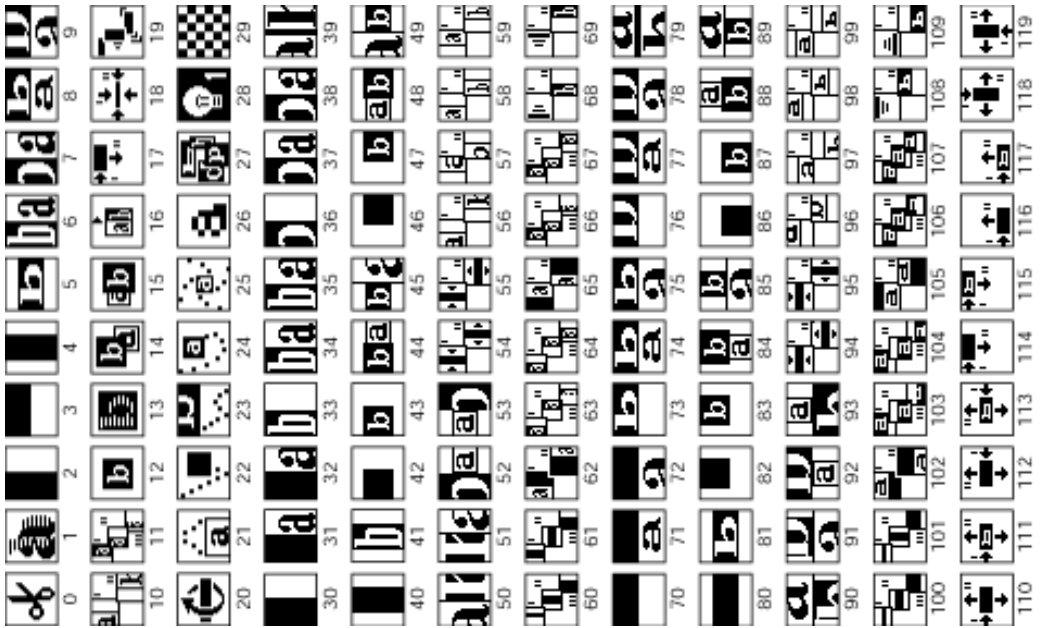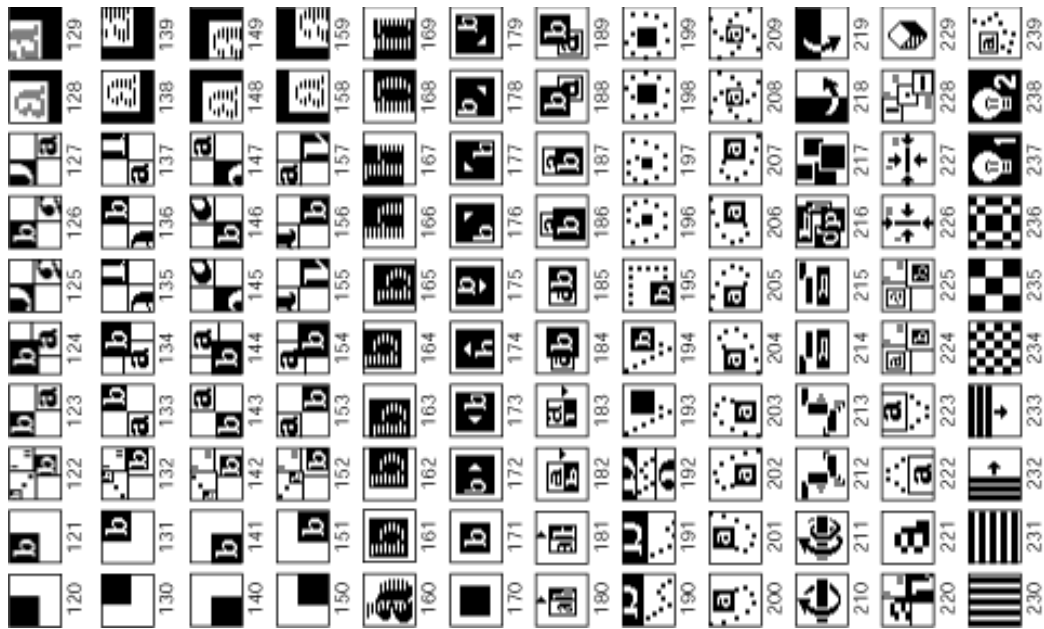
The Basic Transitions category contains transitions numbered from 0 through 299. The category contains a wide assortment of effects.

Transitions 0 through 29 serve as the default assortment in the Transitions Menu. When you turn the unit on for the first time, these transitions appear in the menu. They provide a unique assortment of transitions suitable for many purposes.

In the following table, transitions marked with * (asterisk) always use fixed direction when performed from a frozen picture. They are not affected by the **REVERSE** button. Transitions marked with # (pound sign) operate differently when performed from a frozen picture. Simpler effects are automatically substituted.

Table 1: Descriptions of Basic Transitions

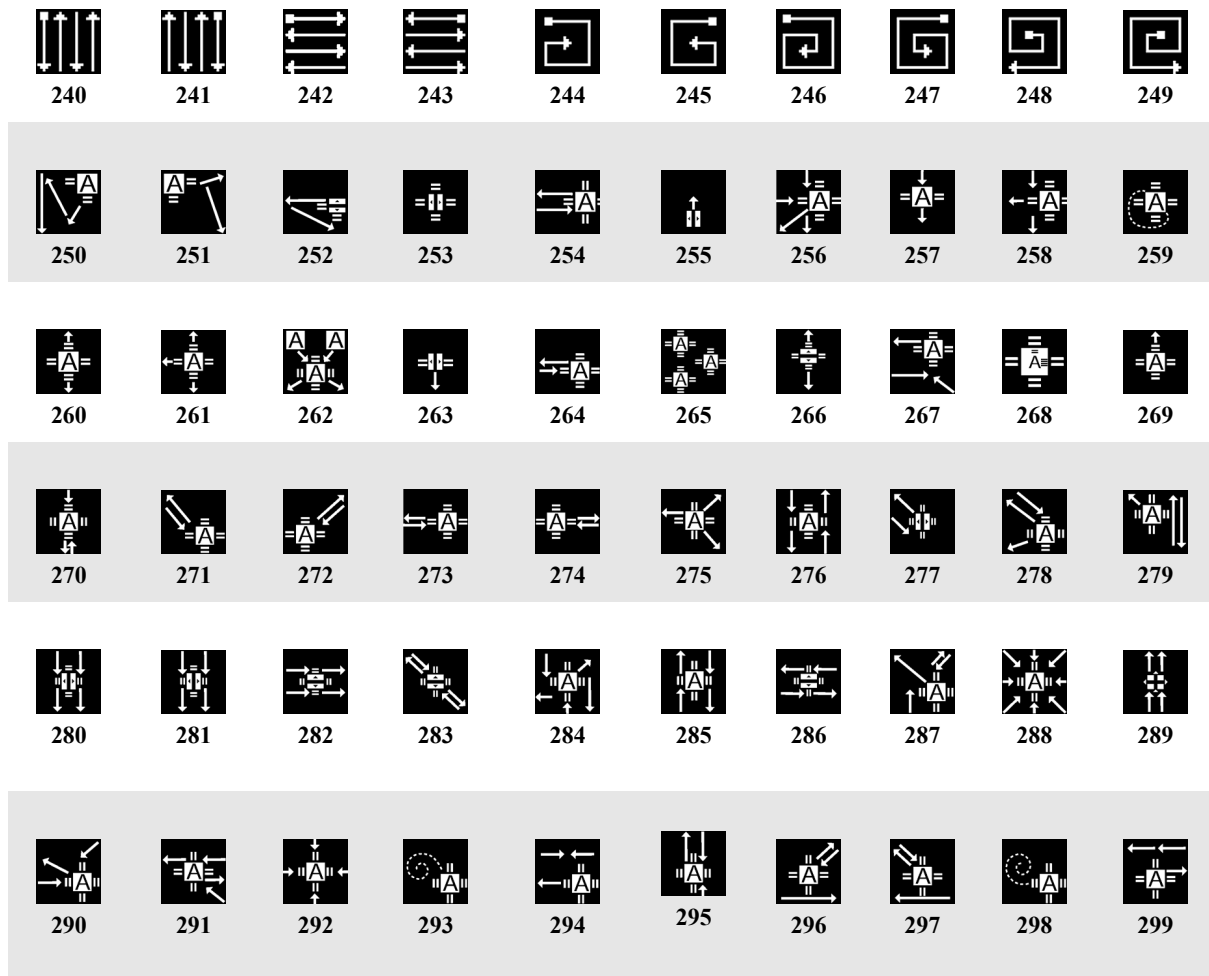| #	DESCRIPTION	#	DESCRIPTION
Default Transition Assortment			
0	Cut	15#	H Comp. (A) alongside (B) in motion; Exp. (B)
1	Dissolve	16	Comp. (A) to 1/2; roll R to (B); Exp
2	H Wipe	17	Slide in slice (B) from L at T; Wipe slice to full
3	V Wipe	18	V Comp. (A) to Ctr slice; H collapse slice to Ctr point
4	H Curtain Wipe (B) from Ctr to full	19	Butterfly from T L/random proportion
5	V Curtain Exp. (B) from Ctr to full	20	Ctr Exp. (B) with 2 flips
6	H Slide (A)/Exp. (B)	21	Ctr Comp. (A); swing back; out B
7	H Slide (A)/Slide (B)	22	Bounce off edges/Wipe
8	V Comp. (A)/Exp. (B)	23	Bounce in from T
9	V Slide (A)/Slide (B)	24*	Comp. (A) to T; CW spiral out to T
10#	H Slide (A) out L; Slide (B) in from L	25*	Comp. (A); CW spiral to Ctr
11*	H Comp. (A) R to 1/2 screen slice; Slide to L; slide under Ctr line	26#	Mosaic Zoom
12	Ctr Exp. (B)	27	Random Sizes & Flips (B)
13	Ctr Exp. & Dissolve (B)	28	Luminance Key 1
14#	Comp. (A) to lower R of (B); Exp. (B)	29	Checkerboard w/middle dissolve
Other Basic Transitions			
30	H Wipe	136	Diagonal Exp. (B) from TRC/Slide (A) to BLC
31*	H Comp. (A)/Wipe (B)	137	Diag. Slide (B) from TRC/Comp. (A) to BLC
32*	H Slide (A)/Wipe (B)	138*	Diagonal Comp. & Dissolve (A) to TRC
33	H Wipe (A)/Exp. (B)	139*	Diagonal Slide & Dissolve (A) to TRC
34	H Comp. (A)/Exp. (B)	140	Diagonal Wipe (B) from BLC
35	H Slide (A)/Exp. (B)	141	Diagonal Exp. (B) from BLC
36	H Wipe (A)/Slide (B)	142	Diagonal Comp. (B) to BLC; Exp.
37	H Comp. (A)/Slide (B)	143	Diag. Exp. (B) from BLC/Comp. (A) to TRC
38	H Slide (A)/Slide (B)	144	143, with overlap
39	H Picture Roll	145	Diagonal Slide (B) from BLC/Slide (A) to TRC
40	H Curtain Wipe (B) from Ctr to full	146	Diagonal Exp. (B) from BLC/Slide (A) to TRC
41	H Curtain Exp. (B) from Ctr to full	147	Diag. Slide (B) from BLC/Comp. (A) to TRC
42	H Wipe (B) from L Ctr	148*	Diagonal Comp. & Dissolve (A) to BLC
43	H Exp. (B) from L Ctr	149*	Diagonal Slide & Dissolve (A) to BLC

Table 1: Descriptions of Basic Transitions (continued)

#	DESCRIPTION	#	DESCRIPTION
44	H Exp. (B) from L Ctr/Comp. (A) to R Ctr		
45	H Exp. (B) from L Ctr/Slide (A) to R	150	Diagonal Wipe (B) from BRC
46	H Wipe (B) from R Ctr	151	Diagonal Exp. (B) from BRC
47	H Exp. (B) from R Ctr	152	Diagonal Comp. (B) to BRC; Exp.
48	H Exp. (B) from R Ctr/Comp. (A) to L Ctr	153	Diag. Exp. (B) from BRC/Comp. (A) to TLC
49	H Exp. (B) from R Ctr/Slide (A) to L	154	153 with overlap
50	H Slide & Wipe (B) from R Ctr/Slide (A) to L	155	Diagonal Slide (B) from BRC/Slide (A) to TLC
51	H Slide & Wipe (B) from L Ctr/Slide (A) to R	156	Diag. Slide (B) from BRC/Comp. (A) to TLC
52	H Slide (B) from L/Comp. (A) to R Ctr	157	Diagonal Exp. (B) from BRC/Slide (A) to TLC
53	H Slide (B) from R/Comp. (A) to L Ctr	158*	Diagonal Comp. & Dissolve (A) to BRC
54#	H Comp. (A) to Ctr line; Exp. (B) from line	159*	Diagonal Slide & Dissolve (A) to BRC
55#	H Comp. (A) to Ctr line; Exp. (B) from line	160	Dissolve
56#	H Slide (A) out L edge; Slide (B) in from edge	161	Ctr Exp. & Dissolve (B)
57	H Slide (A) out R edge; Slide (B) in from edge	162	Exp. & Dissolve (B) from R Ctr
58#	H Comp. (A) to L edge; Exp. (B) from edge	163	Exp. & Dissolve (B) from L Ctr
59	H Comp. (A) to R edge; Exp. (B) from edge	164	Exp. & Dissolve (B) from T Ctr
60	H Wipe 1/4 slice (B); H Wipe 1/2 slice (B); H wipe (B) to R	165	Exp. & Dissolve (B) from B Ctr
61	H Wipe 1/2 slice (B); V Wipe 1/2 slice (B); H wipe (B) to R	166	Diagonal Exp. & Dissolve (B) from TRC
62*	H Comp. (A) L to 1/2 screen slice; Slide slice R	167	Diagonal Exp. & Dissolve (B) from TLC
63*	H Comp. (A) L to 1/2 screen slice; Slide to R; slide under Ctr line	168	Diagonal Exp. & Dissolve (B) from BRC
64*	H Comp. (A) L to 1/2 screen slice; Slide to R; Comp. to Ctr line	169	Diagonal Exp. & Dissolve (B) from BLC
65*	H Comp. (A) R to 1/2 screen slice; Slide to L	170	Ctr Wipe
66*	H Comp. (A) R to 1/2 screen slice; Slide to L; slide under Ctr line	171	Ctr Exp. (B)
67*	H Comp. (A) R to 1/2 screen slice; Slide to L; Comp. to Ctr line	172	Ctr Wipe (B) with Slide from L
68	H Comp. line to L edge; Exp. to full screen	173	Ctr Wipe (B) with Slide from R
69	H Comp. line to R edge; Exp. to full screen	174	Ctr Wipe (B) with Slide from B
70	V Wipe	175	Ctr Wipe (B) with Slide from T

Table 1: Descriptions of Basic Transitions (continued)

#	DESCRIPTION	#	DESCRIPTION
71*	V Comp. (A)/Wipe (B)	176	Ctr Wipe (B) with Slide from B L
72*	V Slide (A)/Wipe (B)	177	Ctr Wipe (B) with Slide from B R
73	V Wipe (A)/Exp. (B)	178	Ctr Wipe (B) with Slide from T L
74	V Comp. (A)/Exp. (B)	179	Ctr Wipe (B) with Slide from T R
75	V Slide (A)/Exp. (B)	180	Comp. (A) to 1/2; roll R to (B); Exp.
76	V Wipe (A)/Slide (B)	181	Comp. (A) to 1/2; slide R to (B); Exp.
77	V Comp. (A)/Slide (B)	182	Comp. (A) to 1/2; roll down to (B); Exp.
78	V Slide (A)/Slide (B)	183	Comp. (A) to 1/2; slide down to (B); Exp.
79	V Picture Roll	184[#]	H Comp. (A) alongside (B) in motion; Exp. (B)
80	V Curtain Wipe (B) from Ctr to full	185[#]	H Comp. (A) alongside (B); shuffle; Exp. (B)
81	V Curtain Exp. (B) from Ctr to full	186[#]	V Comp. (A) above (B) in motion; Exp. (B)
82	V Wipe (B) from T Ctr	187[#]	V Comp. (A) above (B); shuffle; Exp. (B)
83	V Exp. (B) from T Ctr	188[#]	Comp. (A) to lower R of (B); Exp. (B)
84	V Exp. (B) from T Ctr/Comp. (A) to B Ctr	189[#]	Comp. (A) to lower L of (B); Exp. (B)
85	V Exp. (B) from T Ctr/Slide (A) to B	190	Bounce in from T
86	V Wipe (B) from B Ctr	191	Overshoot from T
87	V Exp. (B) from B Ctr	192	Bounce in from T with hammer effect on (A)
88	V Exp. (B) from B Ctr/Comp. (A) to T Ctr	193	Bounce off edges/Wipe
89	V Exp. (B) from B Ctr/Slide (A) to T	194	Bounce off edges/Exp.
90	V Slide & Wipe (B) from B Ctr/Slide (A) to T	195	Perimeter Slide/Exp.
91	V Slide & Wipe (B) from T Ctr/Slide (A) to B	196*	Ctr Wipe (A) to 1/16 screen; CW spiral reveal
92	V Slide (B) from T/Comp. (A) to B Ctr	197*	Ctr Wipe (A) to 1/16 screen; CCW spiral reveal
93	V Slide (B) from B/Comp. (A) to T Ctr	198*	Ctr Wipe (A) to 1/8 screen; CW spiral reveal
94	V Comp. (A) to Ctr line;Exp. (B) from line	199*	Ctr Wipe (A) to 1/8 screen; CCW spiral reveal
95	V Comp. (A) to Ctr line;H Exp. (B) from line	200*	Comp. (A) to T; CW spiral out to T
96	V Slide (A) out T edge; Slide (B) in from T	201*	Comp. (A) to T; CCW spiral out to T
97	V Slide (A) out B edge; Slide (B) in from B	202*	Comp. (A) to B; CW spiral out to B
98	V Comp. (A) to T edge; Exp. (B) from edge	203*	Comp. (A) to B; CCW spiral out to B
99	V Comp. (A) to B edge; Exp. (B) from edge	204*	Comp. (A) to L; CW spiral out to L
100	V Wipe 1/4 slice (B); V Wipe 1/2 slice (B); V wipe (B) to B	205*	Comp. (A) to L; CCW spiral out to L

Table 1: Descriptions of Basic Transitions (continued)

#	DESCRIPTION	#	DESCRIPTION
101	V Wipe 1/2 slice (B); H Wipe 1/2 slice (B); V wipe (B) to B	206*	Comp. (A) to R; CW spiral out to R
102*	V Comp. (A) T to 1/2 screen slice; Slide slice to B	207*	Comp. (A) to R; CCW spiral out to R
103*	V Comp. (A) T to 1/2 screen slice; Slide to B; slide under Ctr line	208*	Comp. (A); CW spiral to Ctr
104*	V Comp. (A) T to 1/2 screen slice; Slide to B; Comp. to Ctr line	209*	Comp. (A); CCW spiral to Ctr
105*	V Comp. (A) B to 1/2 screen slice; Slide to T	210	Ctr Exp. (B) with 2 flips
106*	V Comp. (A) B to 1/2 screen slice; Slide to T; slide under Ctr line	211	Ctr Exp. (B) with 4 flips
107*	V Comp. (A) B to 1/2 screen slice; Slide to T; Comp. to Ctr line	212	Butterfly from T L/random proportion
108	V Comp. line to T edge; Exp. to full screen	213	Butterfly from T R/random proportion
109	V Comp. line to B edge; Exp. to full screen	214	Fly-in from T L/fixed proportion
110	Slide in slice (B) from L Ctr; Wipe slice to full	215	Fly-in from T R/fixed proportion
111	Comp. in slice (B) from L Ctr; Exp. to full	216	Random Sizes & Flips (B); fills screen at end
112	Slide in slice (B) from R Ctr; Wipe slice to full	217	Random Wipes (B); Ctr wipe to full screen
113	Comp. in slice (B) from R Ctr; Exp. to full	218	H Cube Roll
114	Slide in slice (B) from L at T; Wipe slice to full	219	V Cube Roll
115	Comp. in slice (B) from L at T; Exp. to full	220	Zoom in on (A); zoom away from (B)
116	Slide in slice (B) from L at B; Wipe slice to full	221*	Mosaic Zoom
117	Comp. in slice (B) from L at B; Exp. to full	222	Ctr Comp. (A); swing back; out B
118	Slide in Ctr slice (B) from T; Wipe slice to full	223	Ctr Comp. (A); swing back; out T
119	Slide in Ctr slice (B) from B; Wipe slice to full	224*	Ctr Comp. (A);Ctr Exp. (B)
120	Diagonal Wipe (B) from TLC	225[#]	Ctr Comp. & Dissolve (A);Ctr Exp. & Dissolve (B)
121	Diagonal Exp. (B) from TLC	226	H Comp. (A) to Ctr slice; V Comp. slice to Ctr.
122	Diagonal Comp. (B) to TLC; Exp.	227	V Comp. (A) to Ctr slice; H Comp. slice to Ctr.
123	Diag. Exp. (B) from TLC/Comp. (A) to BRC	228	H Comp. (A) to Ctr slice; collapse to Ctr; Exp.
124	123 with overlap	229	Multi-direction Cube roll
125	Diag. Slide (B) from TLC/Slide (A) to BRC	230	H variable stripes
126	Diagonal Exp. (B) from TLC/Slide (A) to BRC	231	V variable stripes

Table 1: Descriptions of Basic Transitions (continued)

#	DESCRIPTION	#	DESCRIPTION
127	Diag. Slide (B) from TLC/Comp. (A) to BRC	232	H stripe-wipe
128*	Diagonal Comp. & Dissolve (A) to TLC	233	V stripe-wipe
129*	Diagonal Slide & Dissolve (A) to TLC	234	Checkerboard w/middle dissolve
130	Diagonal Wipe (B) from TRC	235	Checkerboard w/start to finish dissolve
131	Diagonal Exp. (B) from TRC	236	Checkerboard w/shrinking checkers
132	Diagonal Comp. (B) to TRC; Exp.	237	Luminance Key 1
133	Diag. Exp. (B) from TRC/Comp. (A) to BLC	238	Luminance Key 2
134	133 with overlap	239	(A) wanders out
135	Diagonal Slide (B) from TRC/Slide (A) to BLC	240	Vertical eat away from bottom to top
		241	Vertical eat away from top to bottom
		242	Horizontal eat away from left to right
		243	Horizontal eat away from right to left
		244	Eat away from TLC to Center
		245	Eat away from TRC to Center
		246	Eat away from TLC to bottom BRC; BRC to BLC to Center
		247	Eat away from TRC to bottom BRC; BRC to BLC to Center
		248	Eat away from Center to bottom BLC
250	Slide in (A) from TRC to B; Slide -b back to B up to Trans Exp.	249	Eat away from Center to bottom BRC
251	Slide in (A) from TLC to T; Slide to Ctr then Exp to BRC.	272	Exp from (A) BLC to TRC; Exp from TRC to Ctr.
252	H slide (A) to L with V Flip; Slide to BRC Exp.	273	H Exp (A) from R to L; Exp from R to Ctr.
253	Exp (A) from Ctr with H flip to full screen.	274	H Exp (A) from L to R; Exp from R to Ctr.
254	Comp slide in (A) from R to Ctr to L; Exp slide from L to R to Ctr.	275	H comp (A) from Ctr to R back to Ctr; Exp from Ctr to L back to the R.
255	V comp slide (A) to Ctr; Exp from Ctr with V flip to full screen.	276	V comp (A) from Ctr to T back to Ctr; Exp from Ctr to B back to T.
256	H slide in (A) to BLC; Slide from BLC to T then to B; Slide from B to L then R finishing with Exp to Ctr.	277	Comp slide (A) from BRC to TLC; Comp slide from TLC with H flip to BRC.
257	V Exp slide in (A) to Ctr with Exp to full screen.	278	Comp slide (A) from BRC to TLC; Comp slide from TLC to R then Exp to BLC.
258	H comp slide in (A) to L; Slide from t to B then Exp to Ctr to fill full screen.	279	Comp slide (A) from BRC to TLC; Comp slide V from B to T.

Table 1: Descriptions of Basic Transitions (continued)

#	DESCRIPTION	#	DESCRIPTION
259	H slide in (A) to BRC; CCW Exp Spiral into Ctrt.	280	Comp slide (A) from B to T; Comp slide from T to B with H flip.
260	Ctr Exp (A); Slide from T to B with Exp to full screen.	281	Comp h flip (CA) from Crt to B; Exp H flip from T to B.
261	Slide in (A) from R to L; Slide T to B then Exp from Ctr.	282	Comp V flip (A) from Ctr to R; Exp V flip from L to R.
262	Comp slide in (A) from BRC to Ctr then Exp slide to TLC; Comp slide in (A) from TRC then Exp slide to BLC; Exp from Ctr.	283	Comp slide (A) from BRC to TLC with V flip; Comp from TLC to BRC with V flip.
263	V Exp slide (A) to Ctr; Exp from Ctr with H flip to full screen.	284	Comp slide (A) from Ctr to TRC; Comp slide from TRC to B and back to Ctr.
264	H Exp slide (A) to L; Exp slide from L to Ctr.	285	Comp slide (A) from Ctr to T; Comp slide from T to B back to T.
265	Multipls Exp screens (A) to Ctr.	286	Comp slide (A) from R to L with V flip; Comp slide from L to R with V flip.
266	V Exp slide (A) to B with V flip; Exp slide with V flip to Ctr.	287	Comp slide (A) from BRC to TLC; Comp slide from TLC to B from Exp to TRC.
267	H slide (A) from L to R; Exp slide from BRC to Ctr.	288	Shrink comp (A) from B to Ctr; Slide from TLC to BRC, then from TRC to BLC.
268	H Exp dissolve slide (A) from L to R.	289	Comp V flip (A) from B to Ctr; Comp H flip from Ctr to T.
269	V Exp slide (A) from B to T.	290	Comp slide (A) from L to BRC; Comp slide from BRC to L then TRC to L.
270	V Comp slide (A) from T to Ctr; Ctr Exp slide to B back to Ctr.	291	Comp slide (A) from BRC to Ctr; Comp slide from Ctr to R then flip back to L.
271	Exp (A) from BRC to TLC; From TLC to Ctr.	292	Shrinking Comp slid (A) from B to Ctr.
293	Shrinking comp CCR. Spiral slide (A) from BRC to Ctr.	298	Shrinking comp CR spiral slide (A) from BRC to Ctr.
294	Shrinking comp slide (A) from BRC to L; Shrinking comp from L to R then to Ctr.	299	Comp slide (A) from BLC to R; Comp slide from R to Ctr then Exp to L.
295	Shrinking comp (A) from B to T; Shrinking comp from T to B then to Ctr.		
296	Shrinking comp slide (A) from BLC to TRC; Shrinking comp slide from TRC to BLC then Exp to BRC.		
297	Shrinking comp slide (A) from BRC to TLC; Shrinking comp slide from TLC to BRC then Exp to BLC.		

EDGE TRANSITIONS

Edge transitions move a border across the screen between the outgoing and incoming images. Edge transitions group into sets of six. For example, transitions 300 through 305 perform the same type of effect, but using six different edges: transitions 306 through 311 perform the same type of effect, but using the same six edges as the preceding group: and so forth.

Table 2: Edge Transitions

Horizontal Wipes

300		301		302		303		304		305	

Horizontal Compress (A)/Wipe (B) *

306		307		308		309		310		311	

Horizontal Slide (A)/Wipe (B) *

312		313		314		315		316		317	

Horizontal Wipe (A)/Expand (B)

318		319		320		321		322		323	

Horizontal Compress (A)/Expand (B)

324		325		326		327		328		329	

Horizontal Slide (A)/Expand (B)

330		331		332		333		334		335	

Horizontal Wipe (A)/Slide (B)

336		337		338		339		340		341	

Horizontal Compress (A)/Slide (B)

342		343		344		345		346		347	

Horizontal Slide (A)/Slide (B)

348		349		350		351		352		353	

MISC. TRANSITIONS

Table 3: Misc. Transitions

NO.	ICON	DESCRIPTION	NO.	ICON	DESCRIPTION
400		Rectangle bounces off bottom of screen	415		A circles in from TLC
401		B bounces off bottom of screen	416		A circles in from TRC
402		Rectangle bounces off bottom of screen	417		A circles in from BRC
403		B bounces off bottom of screen	418		A twirls in from edges
404		Rectangle around screen perimeter	419		A twirls in from edges
405		Rectangle around screen perimeter	420		Rectangle circles in from TLC
406		Rectangle circles in from L middle	421		Rectangle circles out from center
407		Rectangle circles in from R middle	422		Rectangle circles out from center
408		Rectangle circles in from L middle	423		Rectangle circles out from center
409		Rectangle circles in from R middle	424		A circles out from center
410		A circles in from L middle	425		A circles out from center
411		A circles in from R middle	426		Rectangle bounces off screen edges
412		A circles in from R middle	427		Rectangle circles screen perimeter
413		A circles in from L middle	428		A twirls away to BRC
414		A circles in from BLC	429		A twirls away to BLC

SHAPE TRANSITIONS

Shape transitions use various geometric and custom shapes (stars, hearts, and so forth) to transition from one image to the next.

Table 4: Shape Transitions

Slide in slice (B) from R Ctr; Wipe slice to full

500		501		502		503		504	
505		506		507		508			

Slide in Ctr slice (B) from T; Wipe slice to full

509		510		511		512		513	
514		515		516		517			

Diagonal Slide Dissolve (A) to TRC *

518		519		520		521		522	
523		524		525		526			

Diagonal Wipe (B) from BLC

527		528		529		530		531	
532		533		534		535			

Ctr Expand Dissolve (B)

536		537		538		539		540	
541		542		543		544			

Diagonal Expand Dissolve (B) from BLC

545		546		547		548		549	
550		551		552		553			

Table 4: Shape Transitions (continued)

Ctr Wipe

554		555		556		557		558	
559		560		561		562			

Ctr Wipe (B) with Horizontal Slide from T

563		564		565		566		567	
568		569		570		571			

Bounce off edges/Wipe

572		573		574		575		576	
577		578		579		580			

Ctr Wipe (A) to 1/16 screen; CCW spiral reveal *

581		582		583		584		585	
586		587		588		589			

Random Sizes Flips (B); fills screen at end

590		591		592		593		594	
595		596		597		598			

Random Wipes (B); Ctr wipe to full screen

599		600		601		602		603	
604		605		606		607			

(A) wanders out

608		609		610		611		612	
613		614		615		616			

Table 4: Shape Transitions (continued)

Horizontal Curtain Expand (B) from Ctr to full										
617		618		619		620		621	
622		623		624		625			
Horizontal Compress (A) to Ctr line; Expand (B) from line										
626		627		628		629		630	
631		632		633		634			
Horizontal Compress (A) L to 1/2 screen slice; Slide slice R *										
635		636		637		638		639	
640		641		642		643			
Horizontal Compress (A) L to 1/2 screen slice; Slide to R; slide under Ctr line *										
644		645		646		647		648	
649		650		651		652			
Horizontal Compress (A) R to 1/2 screen slice; Slide to L; Compress to Ctr line *										
653		654		655		656		657	
658		659		660		661			
Horizontal Compress line to L edge; Expand to full screen										
662		663		664		665		666	
667		668		669		670			
Horizontal wipe										
671		672		673		674		675	
676		677		678		679			
Horizontal Compress (A)/Wipe (B) *										
680		681		682		683		684	

Table 4: Shape Transitions (continued)

685		686		687		688			

Horizontal Wipe (A)/Expand (B)

689		690		691		692		693	
694		695		696		697			

Horizontal Compress (A) to L edge; Expand (B) from edge

698		699		700		701		702	
703		704		705		706			

Slide in Slice (B) for R Ctr: Wipe slice to full

707		708		709		710		711	

Slide to Ctr slice (B) from T; Wipe slice to full

712		713		714		715		716	

Diagonal Slide Dissolve (A) to TRC

717		718		719		720		721	

Diagonal Wipe (B) from BLC

722		723		724		725		726	

Ctr Expand Dissolve (B)

727		728		729		730		731	

Diagonal Expand Dissolve (B) from BLC

732		733		734		735		736	

Ctr Wipe

737		738		739		740		741	

Ctr Wipe (B) with Horizontal Slide from T

742		743		744		745		746	

Table 4: Shape Transitions (continued)

Bounce off edges/Wipe									
747		748		749		750		751	
Ctr Wipe (A) to 1/16 screen; CCW spiral reveal									
752		753		754		755		756	
Random Sizes Flips (B): fills screen at end									
757		758		759		760		761	
Random Wipes (B): Ctr wipe to full screen									
762		763		764		765		766	
(A) wanders out									
767		768		769		770		771	
Horizontal Curtain Expand (B) from Ctr to full									
772		773		774		775		776	
Horizontal Compress (A) to Ctr line; Expand (B) from line									
777		778		779		780		781	
Horizontal Compress (A) L to 1/2 screen slice; Slide slide R*									
782		783		784		785		786	
Horizontal Compress (A) L to 1/2 screen slice; Slide slide R; compress to Ctr line*									
787		788		789		790		791	
Horizontal Compress (A) R to 1/2 screen slice; Slide slide L; slide under Ctr line*									
792		793		794		795		796	
Horizontal Compress line to L edge; Expand to full screen									
797		798		799		800		801	
Horizontal wipe									

Table 4: Shape Transitions (continued)

802		803		804		805		806	

Horizontal Compress (A)/Wipe (B)

807		808		809		810		811	

Horizontal Wipe (A)/Expand (B)

812		813		814		815		816	

Horizontal Compress (A) to L edge; Expand (B) from edge

817		818		819		820		821	

DEFAULT USER TRANSITIONS

The User Transitions category contains a default set of transitions compiled from the other categories. You can tailor the User category to your particular needs — refer to "Changing User Transitions Menu" beginning on page 52.

NOTES

TIME BASE CORRECTOR

The MX-4 DV contains a Time Base Corrector (TBC) that ensures top quality results in your productions. The TBC operates automatically at all times. You don't have to do anything special to use the feature.

TBC compensates for image "shifting" and "wavering" that occurs with many VCR's, camcorders, and other video devices. It modifies the video signal so that all elements in the picture — lines, fields, frames, and individual dots (or, pixels) — appear on the OUTPUT screen exactly where they should. This improves video signal quality significantly.

DUAL TBC MODE

You can use the MX-4 DV TBC as a dedicated, two-channel device to induce time base correction on two separate channels. Set up your equipment as follows:

1   Set up the video devices normally — that is, make one the CURRENT source and make another the NEXT source.

2   Press **DISPLAY** so that the Preview screen shows the NEXT source. (See "Display" beginning on page 69 for instructions.)

The CURRENT source appears on the Output monitor. So the two sources each appear on separate monitors, and both have the benefit of time base correction.

While operating in Dual TBC Mode, the MX-4 DV can perform cut transitions as it normally does. Use the CUT buttons to change the CURRENT source — the one displayed on the Output screen. Use the NEXT buttons to choose the NEXT source — which appears on the Preview screen.

VERTICAL INTERVAL DATA

Time code, closed captioning, and other data in the vertical interval should be added after mixing (downstream from the MX-4 DV). This is necessary because dissolves and other transitions mix the data signals, making them unreadable. The MX-4 DV might remove vertical interval data from the sources, depending on how data has been added and the accuracy of a source's time base.

TBC Technical Information

The following information might be useful to video technicians.

- The MX-4 DV's TBC has no control options. The MX-4 DV always applies TBC to the entire signal, including the horizontal and vertical intervals.

- The MX-4 DV provides a frame-based TBC to correct four sources at a time.

- The output sync of the TBC may be either independent of all input signals, or locked to house-black.

VIDEO QUALITY

The MX-4 DV meets the highest video quality standards. However, video artifacts can appear in video productions, especially when you use sophisticated effects and transitions. This appendix describes some of the video artifacts that can occur.

> **NOTE**
>
> The situations and artifacts discussed in this appendix normally apply to advanced video concepts. They might, therefore, be of interest only to a selected audience.

PREVIEW IMAGE QUALITY

Images appearing on the MX-4 DV Preview screen do not represent the MX-4 DV's true quality because they serve only as a representation of the images. Depending on the type of devices attached, you might occasionally see lines along the sides of the preview images. This is especially noticeable when using cue or review (search) with a VCR or camcorder attached to an input jack, using poor quality video tapes, experiencing bad reception, and so forth. In such cases, you might be able to improve video quality using one or more of the following methods:

- Use only high-quality video sources.

- When using a camcorder or VCR with an Edit switch, turn the switch On to disable playback processing circuits.

- Turn Off any sharpness controls and enhancement circuits.

Preview image quality does not affect video output quality.

You can switch to a full-size, full frame-rate version of the NEXT or CURRENT source at anytime using the **DISPLAY** button. Refer to "Display" beginning on page 69 to learn about all of the display options.

VIDEO SCALING ARTIFACTS

Reducing a video image's size can create artifacts because some picture information must be discarded to reduce the number of pixels in the image. In some cases, picture information might disappear when eliminating pixels. For example, lines in the image might appear jagged when the MX-4 DV removes pixels and, therefore, parts of the line.

Some MX-4 DV transitions scale an image down gradually. This might cause small features to appear and disappear as the image scales down.

The artifacts described here are normal when performing advanced effects. They are normally minor when running transitions at normal speeds.

FREEZE QUALITY

You can set the MX-4 DV to freeze either a frame or a field (refer to "Force Field Freeze" on page 72).

Freeze Field captures one field (half a video frame) and duplicates it to make the two fields that comprise a frame. This eliminates flashing caused when an object occupies a different position in the two captured fields, or when an object is so small it appear in only one field. The MX-4 DV's Field Freeze eliminates flashing artifacts but reduces vertical resolution because it shows only one field.

Freeze Frame captures all fields in the image. This produces a higher quality image, but some flashing might occur.

VIDEO PROCESSING ARTIFACTS

Video processing circuits (such as enhancers, sharpness controls, and the playback circuitry in some VCR's) can *over-process* the video. This might cause the video signal to interfere with the invisible sync portion of the signal, thus making the signal non-standard. Video lines might shift to the right, black lines might enter the picture area from the left edge of the screen, white flashes might appear, the video image might be shredded, or you might see video tearing.
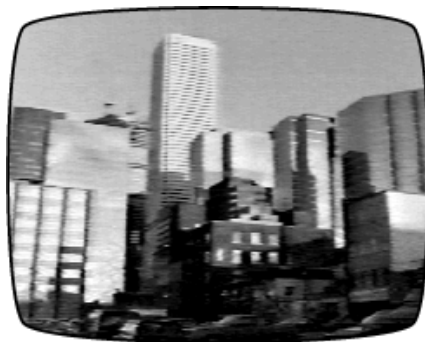
Normal Picture   Picture with Video Tearing

When these types of artifacts occur, reduce or remove the processing to bring the signal back to normal. VCR's and camcorders often have controls that can disable extra processing. If your VCR or camcorder has a Sharpness control, set it to zero or turn it off. If the device has an Edit switch, turn it on.

TECHNICAL SPECIFICATIONS

The MX-4 DV is a four-input video production switcher, mixer, frame synchronizer/TBC (Time Base Corrector), Manual Color Corrector, and special effects generator.

Table 1: MX-4 DV Technical Specifications

GENERAL	
Power Supply	External in-line; 110VAC@60Hz/240VAC@50 Hz
	universal CE/FCC/UL/CSA Approved (Non-US/Canada versions meet local regulatory standards)
Dimensions	16.6" x 9.5" x 3" 422mm x 241mm x 76mm
Weight	4 lbs. (1.8 kg)
Ambient Temperature	32-104°F 0-40°C
Ambient Humidity	Less than 95%
ANALOG INPUTS	
Video	4 x Y/C: Y=1 Vp-p, C=0.30 Vp-p, 75-ohm, 4-pin mini-DIN connectors 4 x composite: 1.0 Vp-p 75-ohm, RCA connectors
Audio	4 x 2 RCA connectors, 50 k ohms
GPI	Mini-jack
HouseBlack	1x composite: 1.0 Vp-p 75-ohm, RCS Connector
ANALOG OUTPUTS	
Video (PREVIEW & MAIN)	1.0 Vp-p, 75 ohm, PREVIEW=1x RCA; MAIN=2x RCA Connectors and 2x Y/C (MAIN): Y=1.0 Vp-p, C=0.3 Vp-p; 75 ohm, 4-pin mini-DIN connector
Audio (L and R)	1 k ohms, 2x L+R RCA connectors
Headphone	Stereo jack, 8-100 ohms, stereo signal
DIGITAL INPUTS/OUTPUTS	
Digital Inputs	4x6 pin IEEE 1394 (Firewire, i.Link) connectors, Audio and Video Effects

Table 1: MX-4 DV Technical Specifications (continued)

Digital Outputs	1x6 pin IEEE 1394 (Firewire, i.Link) connectors, Audio and Video Effects
EFFECTS	
Video	700+ Transitions
Input Effects	Strobe, Mosaic, Flips, Posterize, Brightness, Black and White, Black and White Negative, Color Negative, Contrast, Color Saturation and Hue
Special Effects	Chroma Key and Compose (see partial list under features)
Audio	Mix, Fade, Background
COLOR GENERATORS	
	Millions of Colors
VIDEO PERFORMANCE	
	Meets long-haul video broadcast specification including CCIR-601 sampling and RS-170A
Digital Conversion	13.5 MHZ, 4:2:2, 10-bit quantization (Y/C); 10-bit quantitization (composite)
Time Base	Meets RS-170A standard
Compatibility	Compatible with all NTSC video sources and tape formats (PAL version available)
Gain	Unity
S/N Ratio	Greater than 60 dB (Y/C); Greater than 60 dB (composite)
Horizontal Resolution	480 TV lines/576 TV lines in PAL
AUDIO PERFORMANCE	
Frequency Response	20 Hz - 20 kHz $\pm$ 3 dB
S/N Ratio	80 dB

HELP FOR MXPRO DV USERS

This appendix helps Videonics MXPro DV users make an easy transition to the MX-4 DV. It highlights key operational commands from the MXProDV that have changed with the MX-4 DV.

The MX-4 DV offers may new features and expands the capability of some MXProDV operations. You won't be able to enjoy the full benefits of the new features without reading the other chapters in this Users Guide.

MX-4 DV Defaults to Y/C on All 4-Channels

If you use one or more Composite-type devices as input, you need to change the settings for those devices on the ROUTE screen. Refer to "Route" on page 73 for instructions.

Transitions Organized Differently

All transitions available with the MXProDV are also available with the MX-4 DV, but you can now select from more than 700 different effects. Refer to Appendix A, *Transitions List*, for a complete description of what is now available.

Pressing any Transition Category button displays the menu of transitions available in that category.

The **ARROW** keys move you only within the current category. To get to a different one, press a different Transition Category button (refer to page 50).

Take Bar Operations

The MX-4 DV's Take Bar (**T-BAR**) provides added control over transitions by running it in the direction indicated by the transition direction setting.

Transition Direction Setting

Refer to "Operating the T-Bar" on page 58. Chapter 5, *Transitions*, contains several sections explaining use of the **T-BAR**.

Transitions Compatibility

If you are upgrading to the MX-4 DV from the Videonics MXProDV Video Mixer, the transitions in the Basic category are the same as the MXProDV except that there are 60 new transitions.

The MX-4 DV provides a set of hot keys that directly correspond to the MXProDV Effect buttons. Using the hot keys (refer to Table 6, "MX-4 DV Compatibility Hot Keys," on page 51) causes the MX-4 DV Preview screen cursor to appear at the beginning of each section within the Basic (MX-4 DV) category.

Some terms defined in this glossary might not appear in the body of the User Guide.

A/A Roll

A term originating in the film world. Normally describes rolling a single source into an effects device, such as the FOCUS Enhancements MX-4 DV, and creating transitions between the individual scenes.

A/B Roll

Variation of A/A Roll (described above). Normally describes rolling two or more sources into an effects device, such as the FOCUS Enhancements MX-4 DV, and creating transitions between the various source images.

Betacam

An industry standard format that uses half-inch videotape running at high speed to produce high quality video. It is an evolving standard. There are currently three versions in common use: Betacam, Betacam SP, and Digital Betacam.

Camcorder

Combination camera and video recorder in one device. Normally contains video recording heads as well as a video playback unit (that is, a mini-VCR).

Composite Video

The format used by televisions and laser disc players. Both signals are combined into one signal, which is of lesser quality. Also see **S-Video**.

Counter

A relative indicator of tape position. On VCR/s that do not support time code, the tape counter stores scene locations. Because it is a relative indicator of tape position, it is subject to drift. The same tape logged on one VCR and viewed on another might report different counter locations for the same scene.

Deck

A video cassette/tape player or recorder, also called a *VCR* or *VTR*.

Digital Still Camera

A recording device for taking photographs and storing the information in digital form. The device is similar to a 35mm reflex lens camera that uses traditional film except that it stores the image on a silicon chip. Images can then be *downloaded* to a computer system.

Drop Frame

A variation on the SMPTE time code format. It refers to a scheme designed to compensate for the fact that NTSC actually runs at 29.97 fps. Normal Time Code (or, Non-Drop Frame Time Code) is recorded and calculated based on 30 fps.

Because the actual number of frames per second is really 29.97, a discrepancy occurs causing a loss of slightly more than three seconds each hour. Drop frame corrects for this error by skipping two frames every minute, except on the tenth minute.

Flying Erase Heads

Standard erase heads are mounted along the tape path in a VCR. A flying erase head is built into the video head drum just ahead of the video heads. It makes it possible to erase the video each helical scan at a time resulting in clean video edits with no *rainbow* effect. It is a requirement for high quality video editing.

FPS

Frames **P**er **S**econd. The number of picture frames that are recorded or played during a one second period. Television nominally uses 29.97 fps (NTSC) or 25 fps (PAL).

IR

Infra**R**ed is one of several remote control protocols. It is a one-way protocol that allows a device to send commands to the VCR. Because this is a one-way communication, the VCR cannot send tape location information back. VCR's that offer this limited method of control are suitable only as record decks.

LTC

Longitudinal **T**ime **C**ode is an SMPTE-defined standard for time code, normally recorded onto a linear audio track of a VCR.

NTSC

National **T**elevision **S**tandards **C**ommittee. A body that defines television standards in the USA. NTSC is characterized by each frame being composed of 525 horizontal scanning lines per frame, occurring at 30 frames per second. The format is used in North America, Central America, Japan, and parts of South America. (Also see **PAL** and **SECAM**.)

NVRAM

Non-**V**olatile **R**andom **A**ccess **M**emory. MX-4 DV uses NVRAM to store unit settings so that they are available whenever you power up the unit. Normal (that is, volatile) RAM cannot store information once the power supply is turned off.

OSD

On **S**creen **D**isplay. A feature available on some consumer-level VCR's. When OSD is toggled ON, the VCR displays its status information on the connected video monitor.

PAL

Phase **A**lternating **L**ines. The dominant color television format in Western Europe, Australia, most of Asia, and parts of South America and Africa. PAL is characterized by each frame being composed of 625 horizontal scanning lines occurring 25 times per second. (Also see **NTSC** and **SECAM**.)

RCTC

Rewritable **C**onsumer **T**ime **C**ode (also referred to as RC). Commonly available on 8mm and Hi-8 format devices.

S-Video

A video standard used by camcorders. S-Video separates the Y (luminance) and C (chroma) signals to improve signal quality. Also see **Composite Video**.

SECAM

The standard video signal used in France, Eastern Europe, and parts of Asia and Africa. Also see **NTSC** and **PAL**.

SMPTE

Society of **M**otion **P**icture and **T**elevision **E**ngineers. (Pronounced *simp-tee*.) This committee of engineers and manufacturers establishes the most widely accepted standard for time code. They created specifications for two version of time code: LTC and VITC.

Time Code

A method of putting a unique number or address on each frame of a videotape. There are several formats of time code. The Society of Motion Picture and Television Engineers set the most common time code standard, called SMPTE.

VCR

Video **C**assette **R**ecorder. A video device normally used to record and play back video on cassettes. VCR is a consumer-level term: VCR's in the professional field are normally referred to as VTR's (**V**ideo **T**ape **R**ecorders). VCR's and VTR's perform the same functions, although VTR's usually provide many additional features and functions.

Video Editing

The process of applying special effects to video sequences and assembling those sequences into a video program.

VITC

Vertical **I**nterval **T**ime **C**ode. (Pronounced *vit-see*.) An SMPTE-defined standard for time code, recorded into the video signal during the vertical blanking interval.

VTR

Video **T**ape **R**ecorder. Similar to VCR (see above) except that VTR's are normally used in the professional video field and contain enhanced features. VCR is normally used in conjunction with consumer-level electronics.

NOTES